HISTORIC HEDGEROW HERITAGE OF DUNNINGTON

A study of the hedgerow flora in relation to the history of the hedgerows of the civil parish of Dunnington

Prepared for the Friends of Hagg Wood
By Dr Barry Wright
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NB - Annex 1 is not included as paper copy in this report. It is 465 pages and is available for study, or individual printing on the accompanying DVD. Annexes 9 and 10 will be made available as an addendum once they have been scanned. These comprise 476 double-sided A4 recording forms (952 sides of paper) and 58 A3 field plans. These contain many notes and annotations that may be useful to readers but are not essential to present with this report. An example of each is at Figure 236.92 and Figure 238.94.

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NB - For ease of use, all Appendices, Figures and Tables include the page number in the cross references in the text. For example a reference to Table 10.1 refers to page 10 and table 1.

Acknowledgements

This work has only been made possible by the dedication and enthusiasm of all involved, especially Linda Maggs for commissioning the work and co-ordinating it as well as doing the landowner liaison. I am particularly grateful to Stephen Moorhouse who has provided the essential historical context for the work. The surveys were done by Barry Wright, Linda Maggs, Olwyn Fonseca and the late Ron Bielby to whom this project and report is dedicated. The whole team wish to express their thanks to the sponsors; BBC Breathing Spaces, York City Council and The Rotary Club. In particular, I would like to thank the landowners for allowing such a comprehensive survey to be done.

The late Ron Bielby in hedgerow survey mode. A knowledgeable and dedicated member of the project team, sadly missed.

1. Introduction

1.1. Hedgerows have been a feature of our lowland landscape for a considerable time. Some references to them can be dated to Saxon times. Studying hedgerows can provide a wealth of information about the development of our landscape. They are a living history book waiting to be read. We just need to understand the language.

1.2. The aim of this study is to investigate any linkages between the species of shrubs currently in hedgerows and their history, including their original planting mix and the changes that have occurred through time to the present day.

1.3. Studies of hedgerows are usually interested in determining their age (Pollard, Hooper and Moore 1978) or assessing their biodiversity (Defra 2007) to contribute to our understanding of our natural heritage. Both use the current botanical content as a means of determining age or value.

1.4. For biodiversity, it is the value of the species present today that is used to evaluate which hedgerows are more varied than others i.e., how many species they contain and what they provide for the variety of animals that find food and refuge in hedgerows.

Ageing Hedgerows

1.5. Interpreting the age of hedgerows and their histories normally uses the current number of woody species per 30m to determine the planting time. The concept that the number of species in a hedgerow can be used to estimate age is based on a theory proposed by Max Hooper in the early 1970s (in Pollard, Hooper and Moore 1974, p79.). He argued that planted hedgerows were created with a single species and these hedgerows have subsequently acquired approximately one new species, in a randomly selected 30yd (now 30m) section, every 100 years. Ageing a hedgerow was simplified by Hooper to counting the number of species per 30yds and using his formula to age the hedgerow.

1.6. This is only one possible explanation for the current botanical composition. Both Hooper himself, and other authors Muir and Muir (1987), Muir (1996), Barnes and Williamson (2006) in recent years have suggested that this is one of many hypotheses and that historic hedgerows may have originated as multi-species hedges. This latter theory is explored in this report.

1.7. There is a general correlation that older hedges tend to have more species in their woody component than more recent ones, but the causes of this observed correlation are unclear and need to be critically assessed.

1.8. Because of the limitations of the Hooper approach of only counting a select list of woody species and only in selected 30m sections, the current studies have developed a novel method for surveying hedgerows and interpreting the data. This forms part of the completed PhD research into botanical indicators (at Sheffield Hallam University under Prof Ian Rotherham) under the title:

'A critical assessment of botanical indicators as historic markers in wooded landscapes'.

This study uses the botanical species present today as indicators of past management encompassing both woodlands and hedgerows.

The HEDGES method

1.9. This project is based on a process being developed to provide tools to record information on hedgerows in any condition ranging from a few scattered bushes along a grassy bank to tall and out-grown specimens resembling a line of small trees. This information can then be used to set botanical evidence against available historical information to determine when a hedgerow may have been formed, and why it contains the species it does. This whole process is part of a system of recording and analysis, called HEDGES (Hedgerow Ecological Description Grading and Evaluation System).

1.10. In addition to this new field survey method, HEDGES also incorporates a novel analysis process called SPACES (Species, Position, Abundance and Combination Evaluation System). This essentially looks at the four elements [S]pecies, [P]osition, [A]bundance and [C]ombination and considers what the Species are telling us about the landscape history. The Position, Abundance and Combination of species help to explain hedgerow origins and past management.

1.11. It also takes account of looking for indications that species and species combinations are rooted in their histories (the [T]ime element).

The Dunnington hedgerow survey

1.12. This report introduces the research into the linkage between the history of the hedgerows and the current botanical makeup of the hedgerow network in the civil parish of Dunnington. It presents the results of surveys of every hedgerow in the parish surrounding Dunnington Village to the east of York (SE-671-524). This incorporates the medieval townships of Dunnington, Grimston, *Ianulfestorpe*[1] and an unnamed township identified by landscape historian Stephen Moorhouse, a co-worker on this project.

1.13. The research investigates the patterns and distributions of species and different combinations of species both along individual hedgerow lengths and within hedgerows at a landscape scale. Details of the survey and analysis methods are described in Wright and Rotherham (2011) and Wright *et al* (2012a and 2012b).

1.14. The project investigates links between the botanical data collected and the historical research done by Stephen Moorhouse. His detailed investigations have revealed phases of landscape change. Some of these he has indicated involved periods of hedgerow creation. Identifying these areas and phases has provided the tools to correlate species composition with periods in history (eras). Hedgerows have been added to (and removed from) the landscape over time and it is the challenge of this project to unravel the history of these hedgerow formations and extinctions.

1.15. The phases described by Stephen Moorhouse generally do not have precise dates and relate to periods of change. The exceptions are the dated Enclosures by private treaty (not by Parliamentary Inclosure Act), for Dunnington of 1709 and Dunnington Common from 1772. These enactment dates mean that it is likely that a number of hedgerows will have been created, over a short period, to comply with the requirements laid down by the treaties.

1.16. This report presents the preliminary findings of Stephen's work defining the phases when hedgerows may have

[1] Conventionally, historians italisise the names Townships that do not have current standing in modern civil parish names.

been created and the botanical data that is used to look for patterns attributable to the history of hedgerows in the parish.

1.17. Hedgerows attributable to each phase are analysed and compared to look for evidence that the hedgerows from each phase have species and species mixes in common and can be regarded as the signature for that phase.

1.18. Once a correlation/ signature has been identified using historic evidence to identify characteristic species, and species compositions, the system may be able to be reversed. For example if a species can be attributed almost exclusively - say 90% - to a particular phase e.g., the medieval period, what are the probable explanations for the anomalous 10% that don't occur on medieval boundaries? In some cases it might be that an old hedge is now joined by a newer one and there has been colonisation along the new hedge (hence the need to know the Position). Some of the instances that cannot be explained in this way could be medieval hedgerows that were not identified from the historical research. The association of a species with medieval hedgerows means that if the same species is found on a hedgerow that can't be dated to be medieval it becomes a real likelihood that this is an undocumented medieval hedgerow.

1.19. This summary report describes the results of this integrated research project and provides a tantalising glimpse into the potential for extracting even more information from the botanical and archival records. In order to interpret the history of a given landscape it is essential that as much evidence as possible is brought together to fully appreciate the way in which the land use has evolved over time. Looking only at botanical evidence or historical evidence will result in an incomplete picture being produced that will almost certainly overlook important aspects that need to be addressed.

1.20. Owing to the large scope and scale of the project some of the detailed information is only available as a DVD in some versions (the DVD is provided for all versions), including Annex 1 (the presence of each species recorded in each 1km square of the survey area). The Addendum Annexes 09 (field records sheets) and 10 (field maps) will be missing as hard copy in some editions.

The Project area

1.21. A modern map showing the full scope of the overall study area, and showing those currently being investigated (in

yellow), is at Figure 7.2. It encompasses the current civil parishes of Dunnington and Kexby. Work by historian Stephen Moorhouse has speculated that the present day civil parish of Dunnington is made up of the two recognised medieval Townships of Dunnington and Grimston and a missing Township *Ianulfestorpe* (mentioned in the Domesday Book) and perhaps a further unnamed Township NE of Dunnington Township and NW of *Scoreby* Township. Kexby parish is made up of Kexby and two medieval Townships of *Stamford Bridge West* and *Scoreby*.

1.22. This map is included to show the medieval township of *Scoreby* that is part of a separate investigation. It is referred to in this text as there is information from *Scoreby* that is relevant to the Dunnington study being reported on here. Figure 7.2 places *Scoreby* in the local context and shows that it has a different shape that indicates that even adjacent Townships may have significant differences in their histories. The other Townships in the current civil parish of Dunnington, Kexby and *Stamford Bridge West*, shown on Figure 7.2 have not yet been studied.

1.23. A Township is the basic medieval unit for communal farming resources, local government and taxation. Their boundaries were instrumental in creating the pattern of the modern landscape. They contain the full range of resources essential to farming: arable, closes, assarts, meadow, water, woodland and common grazing. These were located over the appropriate geology and soil cover, and explain the size and varying shapes of townships. The township forms the basis of understanding past landscapes. They should not be confused with the modern Civil Parish, many of which were not created until the 1894 Local Government Act and have no bearing on the layout, development and understanding of earlier landscapes. Also Vill is an Anglicisation of the Latin term *villa* or *villata,* with the same meaning as the vernacular Township (courtesy of Stephen Moorhouse).

1.24. Stephen has also confirmed the layout of the medieval field system for Dunnington. This is shown at Figure 6.1.

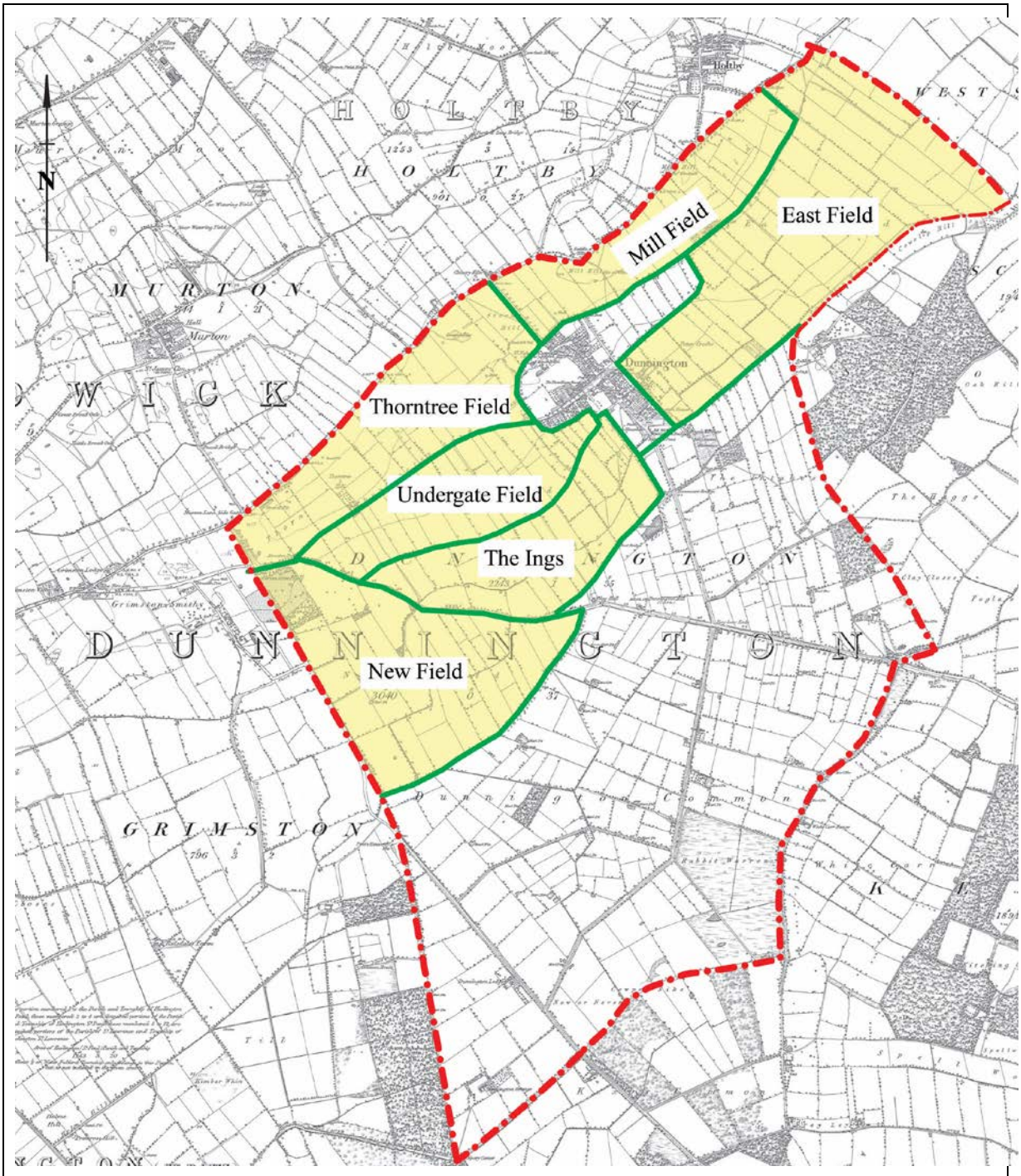

Figure 6.1 – The layout of the medieval open fields for Dunnington.

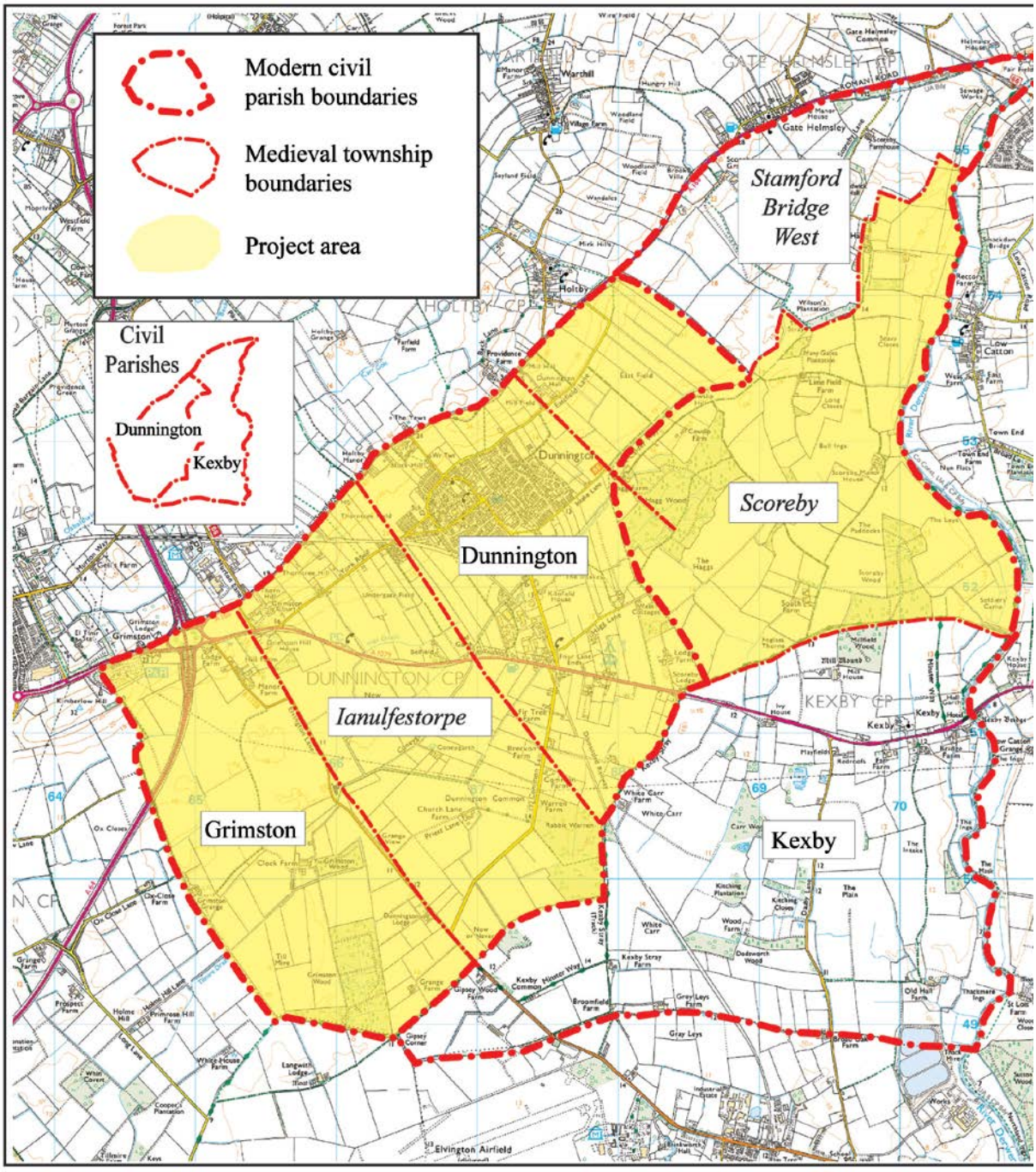

Figure 7.2 - Map of the overall study area, including the nearby medieval township of *Scoreby* (not reported on here) that is part of a separate study and the location of the medieval township of *Stamford Bridge West*. And showing an overview of the current civil parishes (inset).

1.25. The village of Dunnington lies on a glacial moraine that runs approximately SW to NE. The southern part of the township extends onto an area of level ground called Dunnington Common.

1.26. There is an altitude range from 10-37m and three distinct geological formations as shown on the map at Figure 9.4).

Figure 8.3 - A Google earth image looking north, showing a retained fragment of former agricultural field hedge on the western side; at the southern end of Garden Flats Lane (see inset).

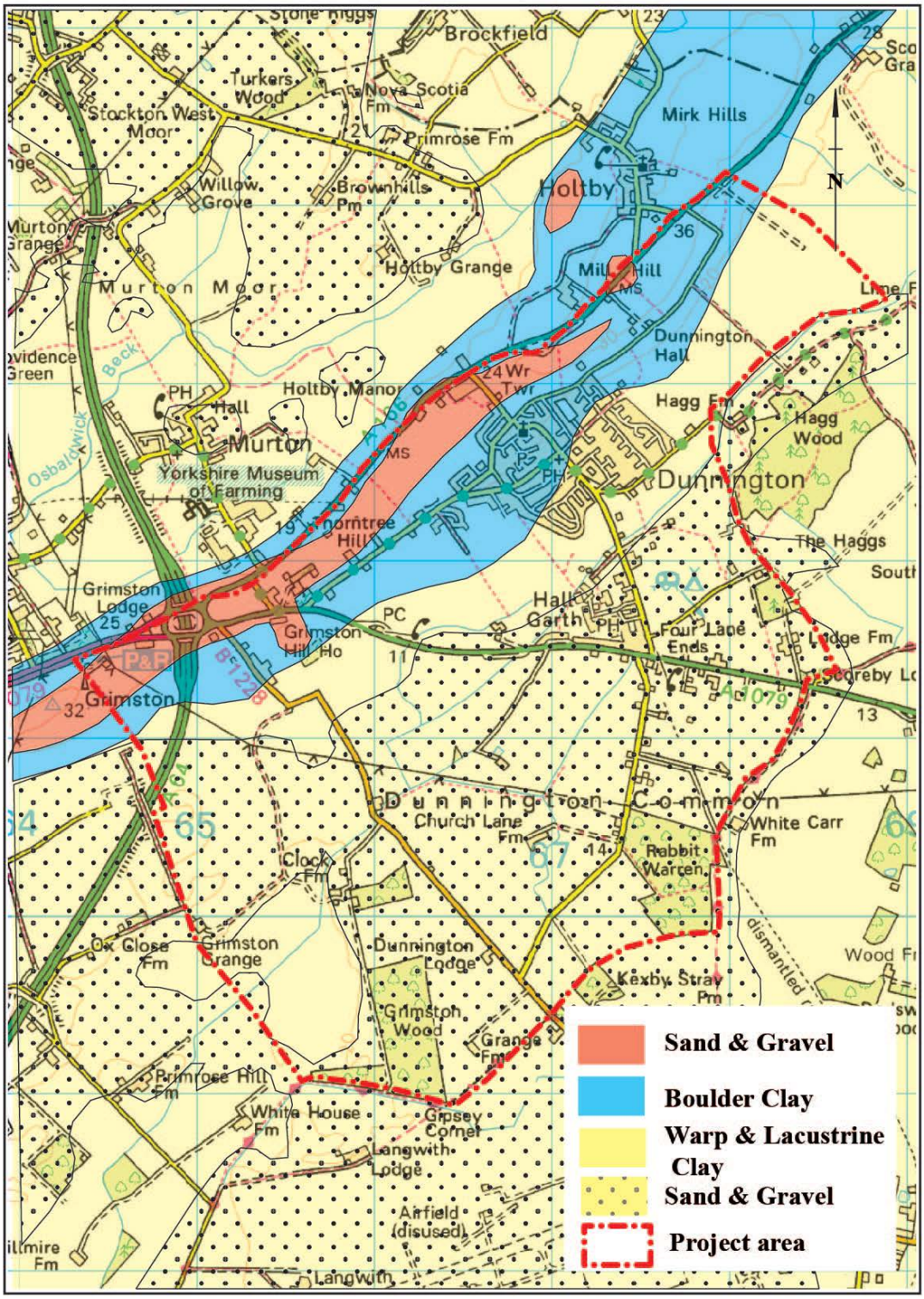

Figure 9.4 - Geological map of the project area.

1.27. The village of Dunnington has greatly expanded in recent times and has consumed a number of hedgerows in the process. Some of these were respected by the developers and are still present today. In other cases the alignment was followed, but the hedge itself appears to have been removed. Good examples are the small fragments of former field hedges that are on the western side of Garden Flats Lane; one fragment towards the middle section of the road and one at the southern end (see Figure 8.3, an extract from Google earth).

1.28. The process that 'traps countryside' is the subject of further work and has been touched on by Wright and Rotherham (2013).

1.29. Google Earth street view is a valuable asset for looking at hedgerows before making a visit to see what the hedgerows look like, or looked like if you have access to historic imagery for the study area.

Hedgerow origins and development.

1.30. Some dating of hedgerow creation cannot be clearly defined and may never be known. In many cases all that can be asserted is that one section of hedge pre- or post-dates another. This is particularly important when determining when, within the medieval period, boundaries may have been formed.

1.31. Hedgerows were created or managed by human effort and can have different purposes:

1.31.a As a boundary defining ownership

1.31.b Making a stock-proof barrier

1.31.c Providing a wind break

1.31.d Screening to provide privacy or hide an eyesore

1.31.e Create a decorative feature along a property boundary

1.31.f Providing valuable wild fruit, timber or other produce

1.32. This study deals with agricultural hedgerows in the countryside around the urbanised areas and ignores domestic property boundaries and any agricultural hedgerows that have been encapsulated by the developments of the village and farmsteads. This is a separate area of research yet to be studied. As shown at Figure 8.3 there is much to be learned from encapsulated urban hedgerows. This figure, and the concept of urban hedgerow encapsulation, is included here to

act as an alert and potentially stimulate this additional study potential at Dunnington.

1.33. Hedgerows are in our farmed landscape because our ancestors either planted them, allowed them to form naturally and managed them, or formed them from woodland clearance leaving a linear strip of woodland as the hedge. They are there deliberately, or because they were accepted and consequently managed as features.

1.34. Hedgerows were formed to fulfil the needs of our ancestors. The alignment and shape (straight or curved) of hedgerows were driven by their needs whilst taking account of local underlying factors like the geology, soil moisture, the presence of existing landscape features like streams and topography and climate etc. The species that they presently contain are the product of what our ancestors planted, or allowed to grow, and the dynamics of changes that have happened up to the present day including the:

- 1.34.a decline or death of certain species
- 1.34.b removal of some species
- 1.34.c colonisation of new species absent originally
- 1.34.d additions by our ancestors.

1.35. The original species could have been a deliberate planting of species additionally useful to the community rather than just performing the function of producing a serviceable stock-proof barrier or boundary between ownerships. The mix of species at the time of original formation in terms of the abundance and distribution along a length is unlikely to be what we see today. Old hedgerows will have had a history of death and re-growth over time and it is most unlikely we see the reflection today of the original mix.

1.36. The diagram at Figure 12.5 shows how the dynamics of species colonisation and extinction could work through time.

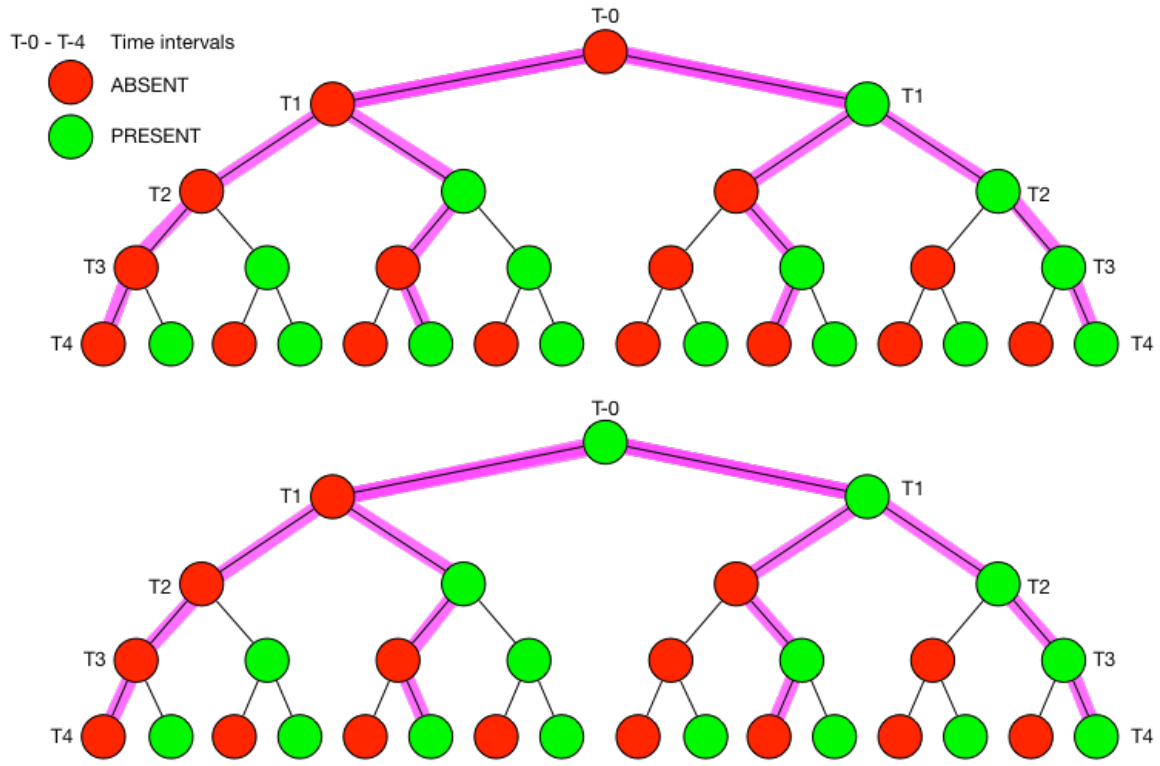

Figure 12.5 - A diagram that shows the wide range of possibilities for species to colonise a hedgerow or be removed possibly in a dynamic way. Two scenarios, one where the species was originally absent and one where it was part of the original mix. The time intervals are not fixed, but could be around 100years as a guide. The purple lines show speculative paths for a species from always absent or lost to always present or gained.

1.37. The range of species originally planted and those seen today must be capable of growing under the local conditions. Some species will be in the locality because they have arrived there by natural colonisation and dispersion processes and others will have been introduced. An example in Yorkshire would be Privet *Ligustrum vulgare*. This species is not normally found this far north, but, if introduced, is perfectly hardy and able to survive here. It is a species that could potentially colonise, but has not yet reached our county by natural means.

1.38. In addition to species colonising and becoming extinct there is also the dynamic of changes in frequency of species or their abundance through time. One species may start as a single plant and spread along the hedgerow and be present today as 20 plants. The converse could also happen, 20 plants originally may end up today as one surviving specimen. Some plants, like English Elm *Ulmus procera* sucker and can spread and overwhelm other less aggressive species. The possible dynamics of changes in frequency of species and their abundances is illustrated at Figure 13.6.

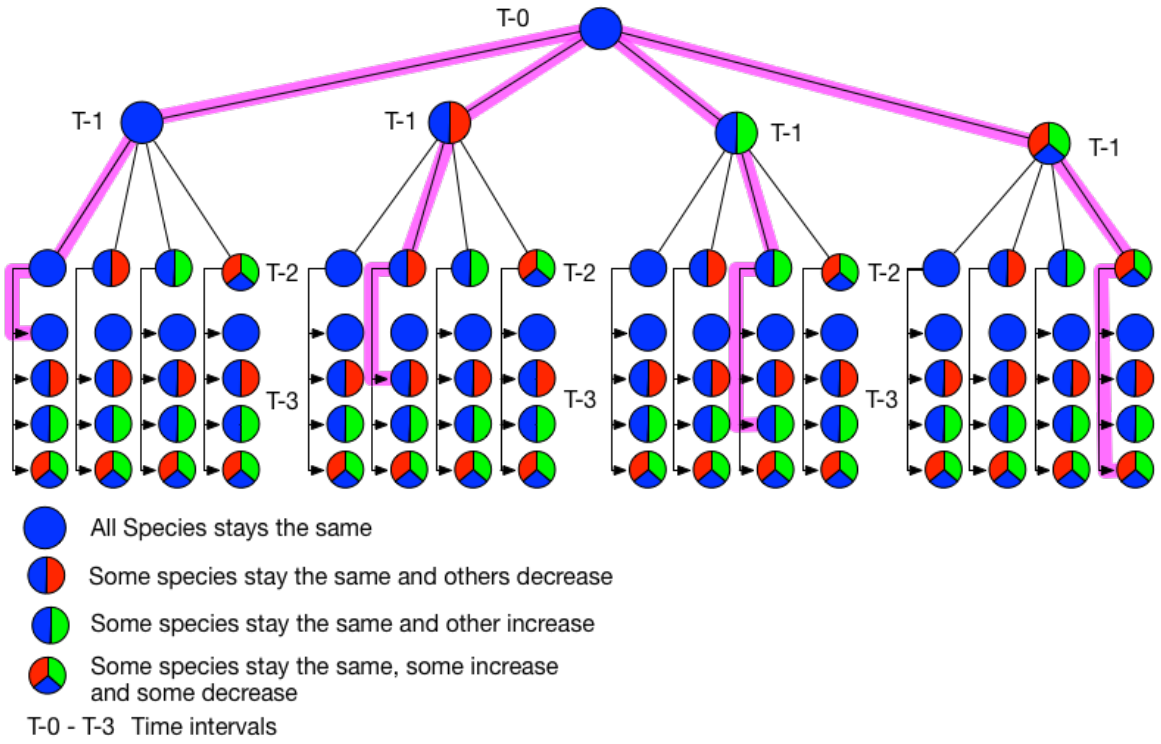

Figure 13.6 - An illustrative diagram to show how either the species frequency or species abundance could change over time. The four purple line trace various speculative scenarios. Where: all species stay the same (Left), some species stay the name whilst other decrease (2nd left), some species stay the same and other increase (3rd left) and the most likely case where some species stay the same, some decrease and some increase (right).

1.39. A crucial part of the studies at Dunnington involved Stephen Moorhouse who has worked on the project using his skills at interrogating archives and has gleaned valuable information from the historical records. His research for this project has enabled links and associations to be made between the hedge species recorded and the documented history. This is an iterative process. The detailed botanical survey is done and compared with the historical accounts. Where species are identified as being predominantly in hedgerows of an identifiable creation period or Era e.g., medieval; or are associated with a specific start date or Epoch e.g., the enclosures of 1709 and 1772; they can be regarded as historic markers for that hedgerow creation event. For example, a species like English Elm *Ulmus procera* (syn *Ulmus minor*) has been found in Dunnington predominantly in hedgerows that can be dated to the medieval period. If 90% of the records can be confidently assigned to this period, this strongly suggests that this was a species of choice at that time. The remaining 10% of

records cannot be assigned to that era. Why? Is this species now present today because:

1.39.a It has seeded in from another hedgerow?

1.39.b It has colonised along a more recent hedgerow by seeding or suckering from an ancient hedgerow it adjoins?

1.39.c It was planted into an ancient section of hedgerow, but the documentary evidence has not been found that confirms its age?

1.40. If reasons 1.39.a or 1.39.b can be eliminated, it is 1.39.c that could offer the exciting prospect of being able to look to the botany to re-assess the historical records. Where historical records are missing or incomplete the historically calibrated botany could be used in reverse to suggest a chronology for the hedgerows based on species and pattern data enlightening or adding to historical records rather than the historical records informing the botany. Or 'if it looks like a medieval hedgerow and has the species composition of a medieval hedgerow, I'd call that a medieval hedgerow' (after James Whitcomb Riley 1849-1916; "When I see a bird that walks like a duck and swims like a duck and quacks like a duck, I call that bird a duck"). This research has been able to characterise what a medieval hedgerow may have comprised. Clearly the passage of time has affected what was originally planted but there are clues as to what the original planting may have been. The general impression is that medieval hedgerows contain a variety of species; some of which are not found in other, more modern, hedgerows and many species that are likely to have been of use to our ancestors as sources of food, timber and medicines.

1.41. Where historic records are lacking, supporting data from areas of similar character (that have benefitted from the availability of both good historic records and a detailed botanical survey) may be used to interpret the chronology of hedgerow creation. In a township where hedgerows contain English Elm *Ulmus procera*, this species probably suggests a medieval origin for these hedgerows. An adjoining or nearby poorly documented Township with this species would suggest that hedgerows here with English Elm may have had the same origins based on the careful historical research and botanical analysis. The more surveys that are done along the lines of the current study the greater the database that will fill the gaps in the historic accounts.

2. Botanical Survey method

2.1. The novel survey method (part of HEDGES) records information from the entire length of any given hedgerow rather than existing methods of selecting one, or more, 30m sections, and ignoring the beginning and end of any hedgerow. It also records all potentially informative species of hedging shrub (including tree species managed as hedging shrubs), trees, climbers like Ivy *Hedera helix*, Honeysuckle *Lonicera periclymenum*, White Bryony *Bryonia dioica*, Black Bryony *Tamus communis* etc. and significant shade adapted ground flora (Bluebell *Hyacinthoides non-scripta*, Wood Anemone *Anemone nemorosa* etc.)

2.2. The fieldwork was recorded and transposed on to a series of maps that indicate which species were found on each hedgerow surveyed. There is an indication of where significant gaps occur (any gap of 4m or more is recorded). For each species there is an overall frequency and local abundance value recorded and, for particular points of interest, individual point records were made, using a GPS e.g. for rare shrubs (normally species at less than 10% frequency - 1st decile species[2] - along the hedgerow), trees, gateways, bridges etc.

2.3. The HEDGES method is part of the Phase 1.5 Habitat Survey System developed by the author to collect better data than standard Phase 1 (JNCC 1990) There are 3 levels of survey:

2.3.a **Level 1** – The most basic level, equivalent to doing an assessment as proposed by Hooper and adopted by the Hedgerows Regulations (HMSO, 1997) and the Hedgerow Survey Handbook (Defra, 2007). This involves assessing one, or more 30m sections, but Level 1 of HEDGES adds the facility to record other parameters like the abundance of species and the structure of the hedge and any evident earthworks.

2.3.b **Level 2** – A rapid survey method looking at the entire length of a hedgerow – between recognisable points like hedgerows joining at each end. This level records the abundance of all species along the defined length and identifies the exact locations of the rarer species using a GPS. All trees, and their positions, are recorded along with their

[2] The 1st decile is the first 10% i.e., if Hazel *Corylus avellana* was found at 10% frequency or less it could be called a 1st decile species.

size and character – Coppice, Pollard etc. The method also records the structural parameters of the hedgerow, banks, ditches, evidence of laying etc. This method is used at Dunnington.

2.3.c **Level 3** – This looks at the range of species every 4m along the length and assigns an abundance to each. It also records trees and the structural hedgerow features. This produces an output consisting of dots, varying in size dependant on the species abundance, indicating exactly where each species is present or absent. It also produces a 'hedge-o-gram' showing all species along the length and the abundance of each (See Table 17.1). Each Record Point represents a 4m section of hedgerow and is made up from the GPS waypoint number for the start of the hedgerow, the GPS waypoint for the end of the hedgerow and a sequential number for the 4m section. This provides a unique identifier for any 4m section surveyed as part of a Level 3 survey. In this example there were 27 record points making the hedgerow length approximately 108m long. Hawthorn *Crataegus monogyna* dominated (Blue) for the first 28m followed by a dominant block of 32m of Holly *Ilex aquifolium*. The paler blues are lower abundances for the species present within each 4m sampling section and the black/ grey indicate a gap with no shrubs present.

Table 17.1 - A typical short Hedge-o-gram from a Level 3 survey

Record Point	GAP	Hawthorn	Holly	Hazel	Ivy	Dogwood	Blackthorn	Elder	Dog Rose	Bracken	Hedge Garlic	Dog's Mercury	Ramsons
CL591-CL593-01													
CL591-CL593-02													
CL591-CL593-03													
CL591-CL593-04													
CL591-CL593-05													
CL591-CL593-06													
CL591-CL593-07													
CL591-CL593-08													
CL591-CL593-09													
CL591-CL593-10													
CL591-CL593-11													
CL591-CL593-12													
CL591-CL593-13													
CL591-CL593-14													
CL591-CL593-15													
CL591-CL593-16													
CL591-CL593-17													
CL591-CL593-18													
CL591-CL593-19													
CL591-CL593-20													
CL591-CL593-21													
CL591-CL593-22													
CL591-CL593-23													
CL591-CL593-24													
CL591-CL593-25													
CL591-CL593-26													
CL591-CL593-27													
Total	5	12	12	9	7	6	5	5	2	12	3	3	2

Black = GAP; Grey = Partial GAP; Pale Cyan = Low abundance; Mid-Cyan = Medium abundance; Blue = Abundant.

2.4. The hedgerow from which the data at Figure 18.7 was collected is off Westwood Road between Wetherby and Bramham at SE408447. This is part way along a footpath from the road, to Dalton Lane (see Figure 18.7).

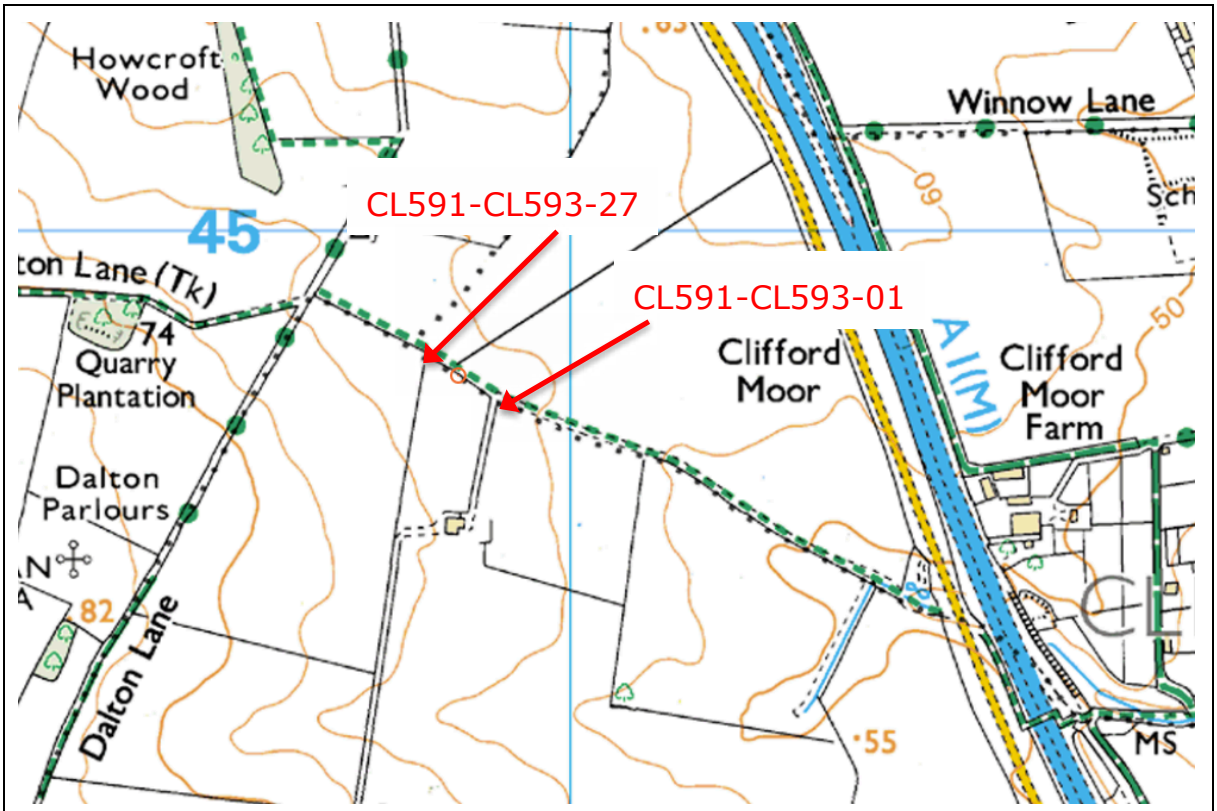

Figure 18.7 – Map showing the location of the section of hedgerow from which the data at Table 17.1 was obtained.

2.5. A photograph of part of this section is at Figure 19.8. This is looking west and shows the end of the section of Holly *Ilex aquifolium* at around Record Point CL591-CL593-13 with the Hazel *Corylus avellana* visible a short distance from the camera at Record Point CL591-CL593-16.

Figure 19.8 – Photograph of [CL591-CL593] looking west.

2.6. The current project is based on a Level 2 survey method, with the option of returning to study selected hedgerows to Level 3. At the request of the parish council the hedgerows both sides of Hagg Lane were surveyed at Level 3 in 2008. A separate report on this study is presented at Annex 8.

Hedgerow Mapping

2.7. The DVD provides extremely detailed information in the form of maps and field data/ maps etc. The aim has been to provide information accessible to all. Some of the annexes are not included as hard copy in all editions of the report and the reader can print any of them from the DVD. Therefore a scale has been set that fits onto A4 paper to accommodate the output capabilities of most home printers.

Map numbering

2.8. The whole study area has been divided into numbered 1km grid squares starting at [A1] in the SW corner and extending to [E5] to the NE; these are identified in the text in square brackets e.g., [B4] (see Figure 21.9). The detailed maps

presented in the appendices and annexes are centred on these and usually have the square number in them unless omitted for clarity. Each of these maps has an overlap of about 20% all around. In some cases the text may refer to two squares, where both ends of the hedgerow are not visible on a single tile and there is insufficient overlap to show both ends in a single sheet, e.g., a hedgerow may cross from [D5] to [E5] and be indicated as [D5-E5] (see 2.15).

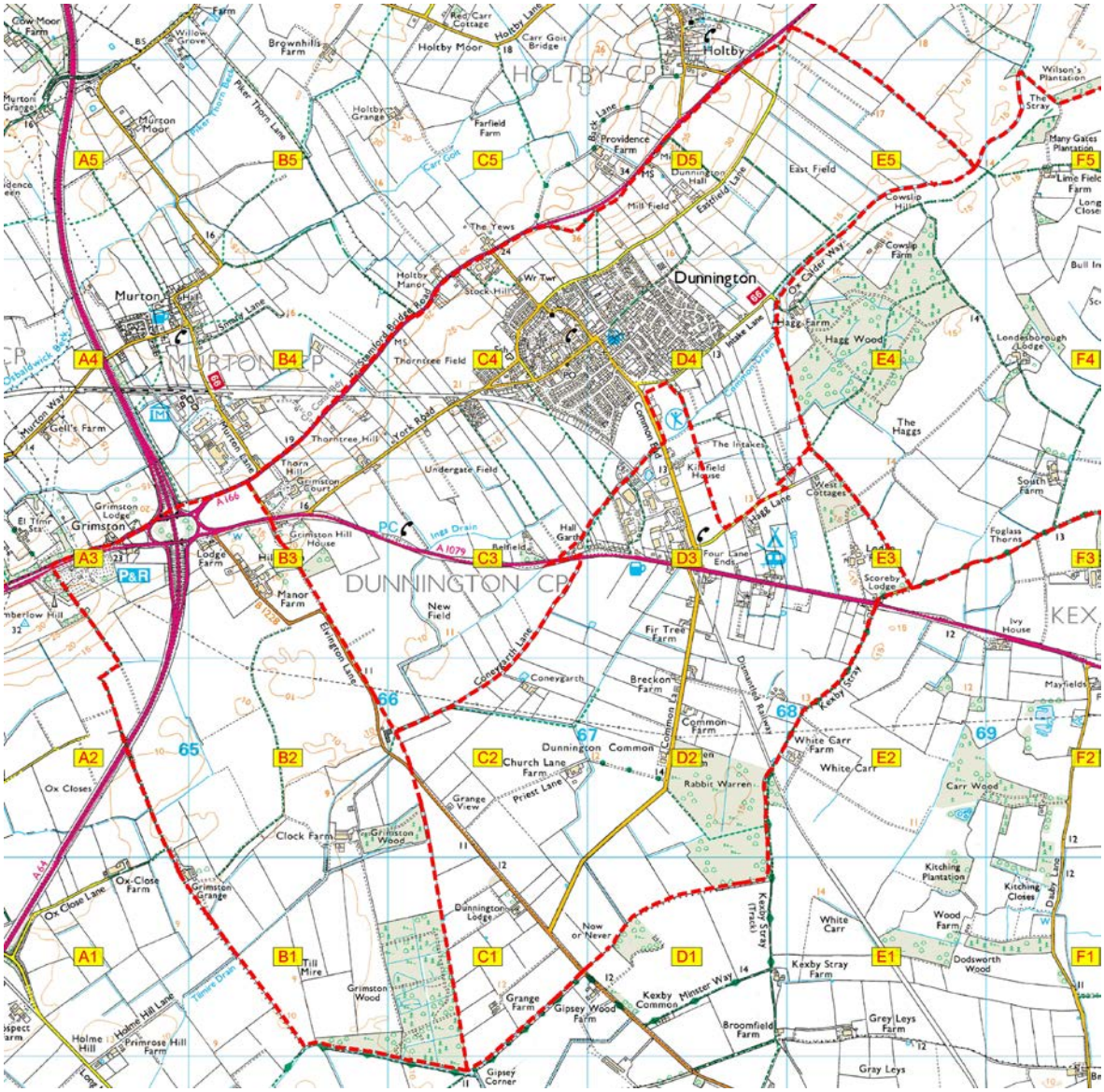

Figure 21.9 – Dunnington civil parish study area showing the 1km map index letters and numbers.

2.9. Four sets of maps are provided on the DVD showing the individual 1km sheets marked, in addition to the index map at Figure 21.9.

- Annex 1 shows the species data for each 1km square
- Annex 2 show each 1km square based on the 1st ed. 25 inch OS map
- Annex 3 shows the same 1km grid squares using the modern 1:10,000 OS base and incorporating the township boundary indication to demonstrate which township was responsible for each boundary hedge. The green border is on the side of the Township that is responsible for that hedgerow.

- Annex 4 shows the detailed 1km squares numbering individual hedgerow section nodes.

Hedge Section Identification.

2.10. Hedgerow sections were defined and then surveyed as hedgerows running between two other hedgerows or other landscape features like woodland. Some free-standing hedgerows were recorded as well as some that began at a junction or a wood but terminated in the middle of a field. Both ends of all surveyed sections are recorded using the GPS waypoints. These points are referred to as nodes and are shown on the maps at Annex 4.

2.11. The GPS waypoint numbers are a combination of a unique two-letter prefix and the number generated by the device when a waypoint is set. This is necessary as GPS devices normally only record up to 1000 waypoints and if two survey teams are working they will duplicate numbers. The two-letter prefix avoids this problem.

2.12. References to hedgerows identify the 1km square number [A3] (see Figure 21.9) and the hedge reference e.g., [BX092-BX117] (waypoint numbers and their prefixes). These combine to [A3][BX092-BX117]. Also, for convenience in looking up a particular reference, the annex page numbers are normally included as well [A1-411][BX095-BX117].

2.13. As an example Spindle *Euonymus europeaus* in the hedgerow east of Derwent Nurseries on Elvington Lane in square [C2] is at the hedge reference [BX092-BX117]: or [C2][BX092-BX117]. This hedgerow is found in Annex 1 at page 411, or [A1-411] (see Figure 23.10).

2.14. The original waypoint numbers for each node are used to number the survey lengths. This eliminates the errors of renumbering and allows for any additional hedgerows to be surveyed without having to renumber the whole sequence.

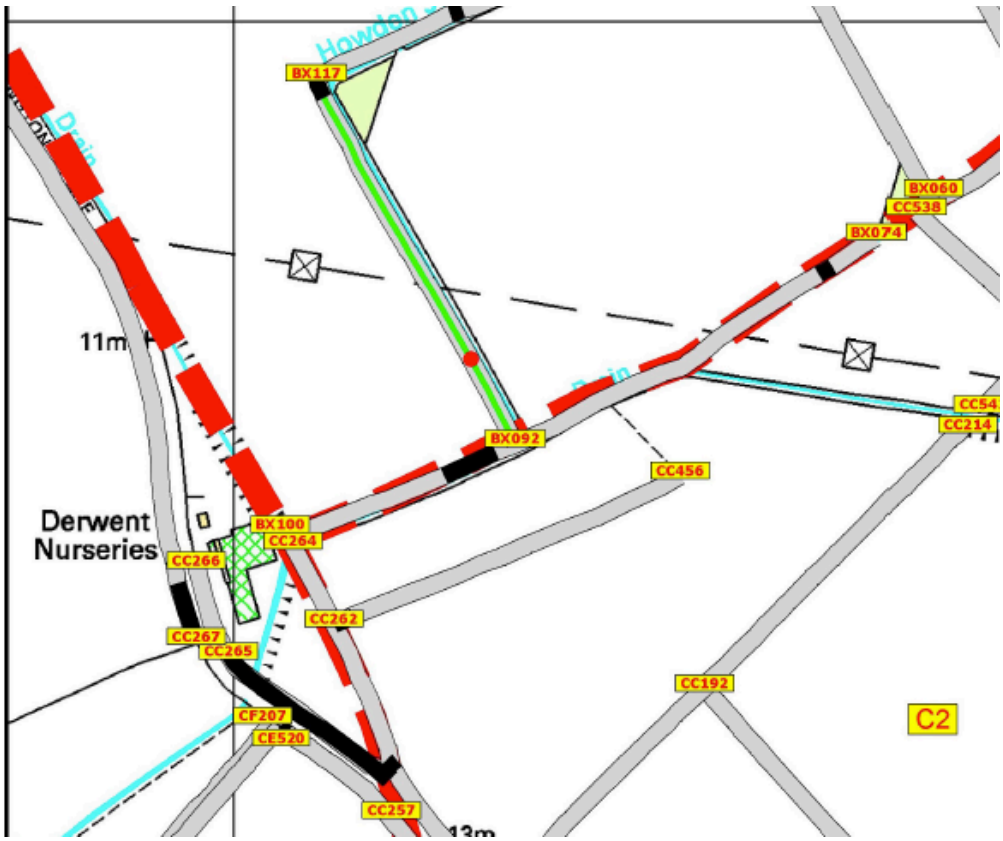

Figure 23.10 – Extract of the NW corner of a 1km map for Spindle *Euonymus europeaus*. From Annex 1 page 411 showing Spindle presence on hedgerow [A1-411]BX092-BX117] as a green line and the precise location of the single plant where the red dot is located. Grey lines show hedgerows that were surveyed, but did not contain Spindle.

2.15. The standard hedgerows numbering is to ensure that the two end node waypoints are in strict alpha-numeric order regardless of the direction the hedge may have been surveyed. For example there is a hedge east of the village on [D5] that runs south-east from Eastfield Lane toward the township boundary of *Scoreby*. At the western end is waypoint [BS620] in [D5] and at the eastern end is waypoint [BS569] in [E5]. This hedge is therefore numbered [BS569-BS620], i.e., east to west, even though it may have actually been surveyed west to east. This keeps the system of referencing ordered and logical. The full reference for this hedgerow would be [E5] [BS569] - [D5][BS620] as it spans [D5] and [E5]. As [BS620] is located in [D5] and [BS569] in [E5] to find this hedgerow you need to look for [BS620] at the eastern edge of [D5] where it borders [E5] then look at the western edge of [E5] to find [BS569].

2.16. Each of the species maps in the annexes are on individual single-sided sheets to enable the reader to extract all maps for a given square and compare the species found in each hedgerow.

2.17. Extracting all the species sheets for [C2] will allow the comparison of specific hedgerows to see which species they contain and the distribution of all species, including minor species recorded at <10% frequency/ abundance (1st decile species).

Figure 24.11 – Extract of map [D5] showing hedge [BS569-BS620] with the [BS620] node on this map with node [BS569] off to the SE on map [E5] (vertical grey line = grid line).

Figure 24.12 – Extract of map [E5] showing hedge [BS569-BS620] with the [BS569] node on this map and node [BS620] just visible to the NW(vertical grey line = grid line).

2.18. These individual references are only practicable to show on maps that display a single 1km square.

Species Recording

2.19. All shrubs and trees were recorded to species level where possible. Some species were difficult to confirm their identities, especially the apples and the Blackthorn/ Damson group. There were clearly both Crab Apple *Malus sylvestris* and sweet Domestic Apple *Malus domestica*. The difference used was the size of leaf and the glossiness, Crab apple being small-leaved and glossy and Domestic Apple being larger-leaved and matt or dull. The identification was easier later in the season

when there was the potential for fruit to be present, although not always.

2.20. The Blackthorn *Prunus spinosa* vs. Damson *Prunus insititia* case was less likely to be resolved by fruiting and may need further work as leaf size was a variable character. Blackthorn should be small and narrow, Damson broad and larger. Damson also seems to have two glands at the top of the leaf stalk in keeping with the character found on plums.

2.21. There are three types of botanical record.

2.21.a Total hedge abundance values for each species

2.21.b Individual shrub records and

2.21.c Individual tree records

2.22. The total hedge species abundance values use a simple modification of the widely used DAFOR system (a standard measure used by county recorders, researchers and ecological surveyors where abundance values are required), called the DDAFOR or double DAFOR. DDAFOR was a unique system developed by the author to collect and present more detail on the often patchy and clumped distribution of species in both linear features like hedgerows and area features like woods. This has now been refined to double SACFOR or SSACFOR as described at Appendix 212.1. However, for this report the DDAFOR system was used. The only difference being that the SSAFOR value [S]uper-abundant equates to the DDAFOR value [D]ominant and the SSAFOR value [C]ommon = DAFOR [A]bundant. The original DDAFOR diagram used for this survey is at Figure 26.13.

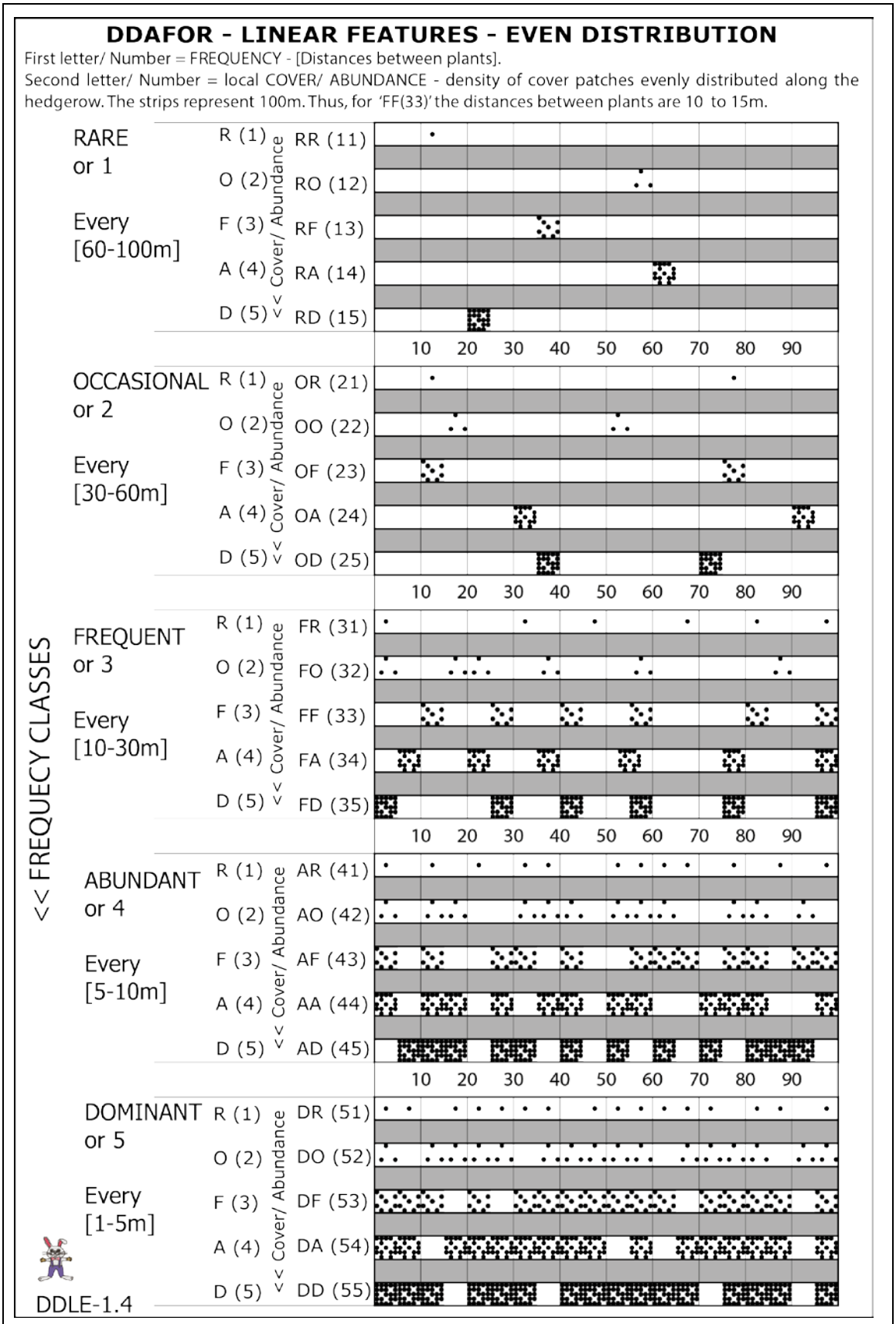

Figure 26.13 - The original DDAFOR diagram used in this report to describe frequency/ abundance of shrubs in hedgerows.

2.23. The DAFOR scale uses familiar terms that attempt to indicate both frequency and abundance in one word (Dominant, Abundant, Frequent, Occasional, Rare).

2.24. The two parameters of frequency and abundance should ideally be treated independently. Frequency records how many plants or density, whereas abundance records quantity or cover (area of ground covered or volume in a 3D hedge assessment). For example one oak tree is only a single plant but it covers a large amount of ground if viewed vertically downwards and occupies a large 3-dimensional volume of space. By comparison a fine-leaved grass like Red Fescue *Festuca rubra* has many leaves but the plants do not generally have a large cover value, appearing as a miniature open forest of fine blades in a matrix of other species. It may be in every part of a 1m x 1m quadrat but not exceed even 5% cover.

2.25. Authors like Kent and Coker (1992) have applied percentage cover values to DAFOR codes to aid interpretation and in an attempt to standardise the scale using ranges suggested by Braun-Blanquet as follows:

- D = 76-100%
- A = 51-75%
- F = 26-50%
- O = 6-25%
- R = <5%

2.26. There are also other published conversions that use different cut-off points. The Braun-Blanquet scale seems to be a fair interpretation of the words used in the DAFOR scale, but using percentages implies cover or abundance rather than frequency.

2.27. As there are two elements to consider, frequency and abundance, with hedge plants, the frequency would be the number of bushes, or stems for a climber, and the abundance would be the amount of leaf and twig area or volume the species occupied where it occurred.

2.28. DDAFOR separates the frequency and abundance assessments by assigning two letters; the first being the frequency – how many plants or occurrences and the second being the local abundance – how much there is at each location. A graphical representation of SSACFOR is shown at Figure 218.89 with the original DDAFOR at Figure 26.13.

2.29. In essence a species might be only scattered plants (Occasional) along a hedge, or across the landscape, but where it is found it may be obvious and Abundant or even Dominant.

This would be coded OA or OD to signify Occasional-Abundant or Occasional-Dominant.

2.30. The illustrations are key, the nomenclature is merely a means to put this into words. This system also interprets the frequency in terms of how many metres could be between plants and also % estimates for each of the DAFOR letters to provide additional methods for recorders to comprehend what is intended by the assessment.

2.31. By recording the frequency/ abundance in this way a more comprehensive indication of the species presence is obtained. Knowing that Holly *Ilex aquifolium* is OD in a hedge is more informative than recording it as 'O' and even more valuable than just recording it as present, which is all that is required by the 'Hooper', and other survey methods.

2.32. The current survey technique identifies all species within the hedgerow, including those that are relatively uncommon – 1st decile species (<10% cover) - and, using modern GPS technology, records the exact location of these specimens. These are individual shrub records that supplement the abundance assessments for the whole hedgerow section. The advantage of this approach is that the pattern of 1st decile species can be informative and be used in the Position part of the SPACES analysis (see Appendix 219.2).

2.33. The use of GPS technology is also applied to recording the location of any existing hedgerow trees and stumps. These are the individual tree records. The species were recorded and their estimated girth/ diameter is used to identify any patterns to the age of hedgerow trees and the age of the hedgerows.

Species mapping

2.34. The distribution of each species across the study area is contained in Annex 6 (an example for Ash *Fraxinus excelsior* is shown at Figure 29.14). A yellow line indicates which hedgerows were surveyed and a red line indicates the presence of the species as a shrub. The length of gaps in the hedge are shown as black sections. Where a species is recorded both in the hedge component and as a specimen tree, the trees are included on the species maps at this scale as green dots. This gives a visual impression of the distribution of trees across the study area.

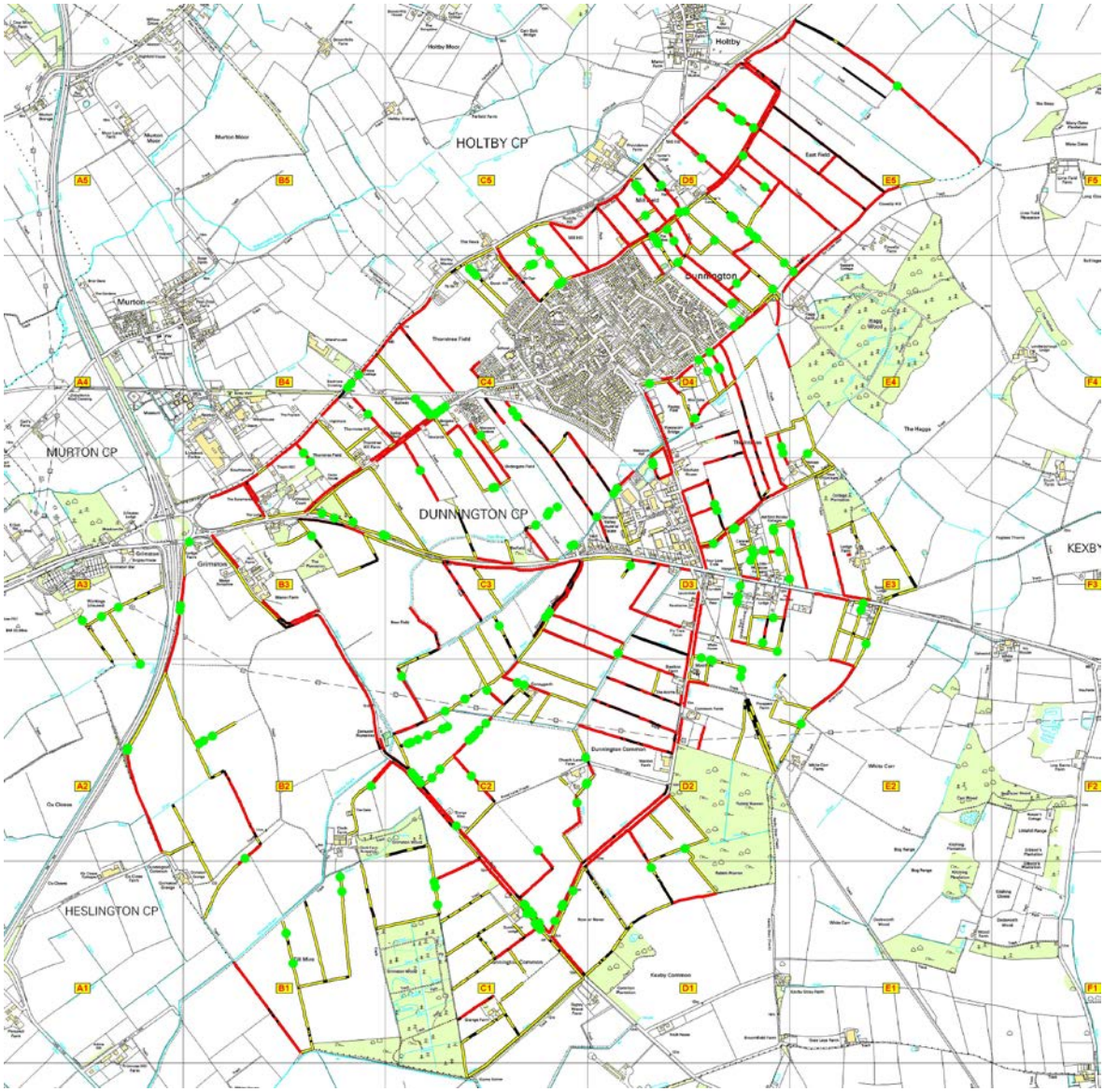

Figure 29.14 – An example map showing the distribution of Ash as a hedge component and as a a hedgerow tree across the whole study area. Red lines = present; Yellow = absent; Black = gap/ hedge missing; Green dot = Ash as a tree.

2.35. Annex 1 shows the close-up detail for each species based on the indexed 1km squares. The surveyed hedgerows are in grey. The length and extent of any gaps in the hedge are again shown as black sections.

2.36. For Annex 1 a green line of varying width represents the DDAFOR frequency – first letter – and the depth of green colour represents the local abundance value – second letter. Thus a species that was RR = Rare-Rare – this would be a thin pale green line, RD would be a thin dark green line and FD would be a medium thickness dark green etc.

2.37. Added to these green lines are the individual records for the 1st decile species. These are indicated as red dots of uniform size representing single bushes.

2.38. Trees at this level of detail are shown as green cartwheels with a diameter reflecting the tree trunk diameter. This gives a visual impression of the distribution of trees belonging to different plantings. Many trees were below 1m in diameter, but there were some specimens that were clearly older and had much larger diameters.

2.39. An example for Ash in the 1Km square NE of the village is shown at Figure 31.15.

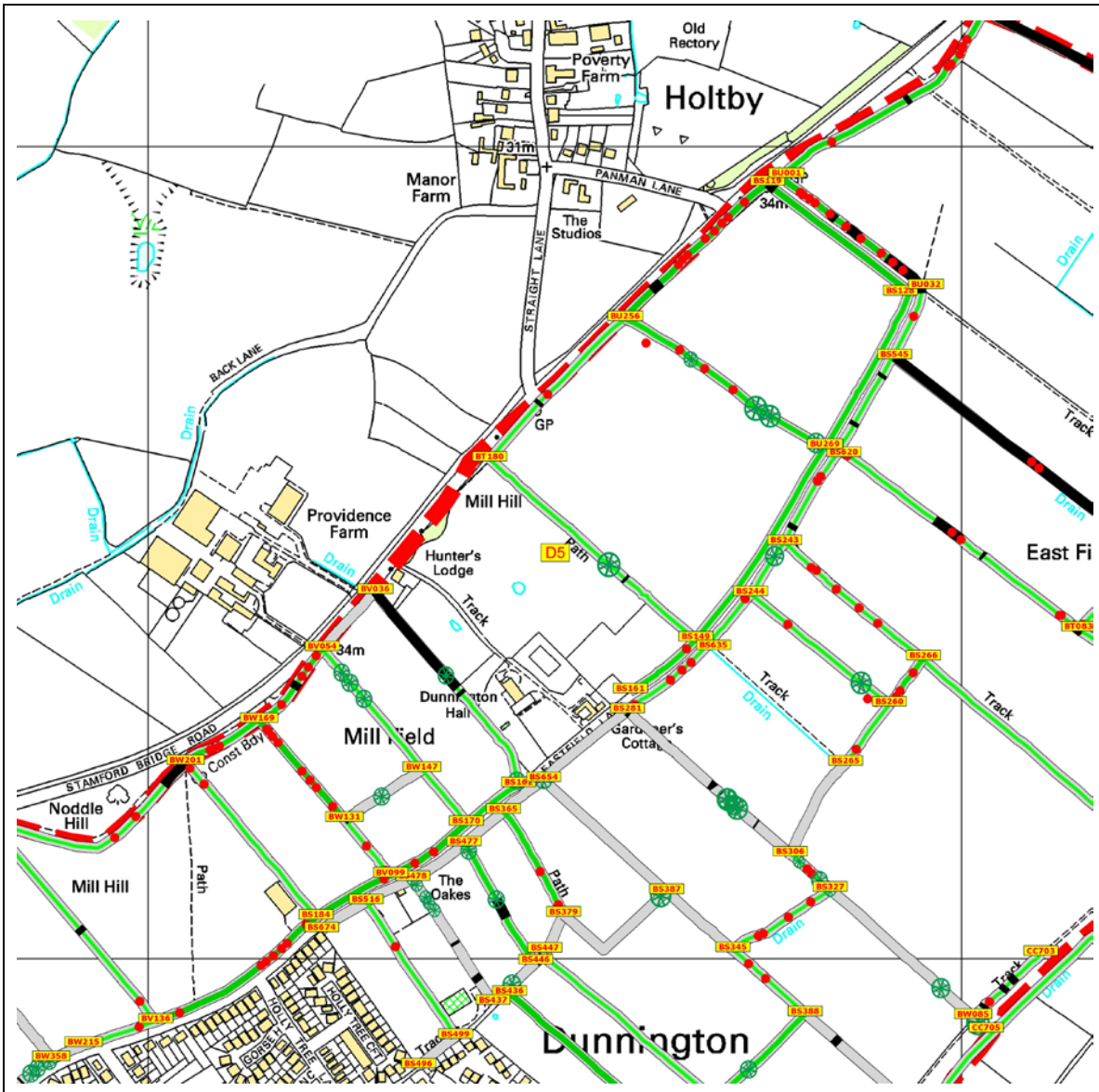

Figure 31.15 – An example map showing the distribution of Ash in [D5]. Green line = present (abundance width (overall) and colour (locally) indicate); Red dot = Ash as a shrub in the hedge; Green cartwheel = Ash tree (diameter = size of trunk); Grey line = surveyed hedgerow, but Ash not present; Black line = gap/ hedge missing.

3. Botanical Analysis Method

3.1. The survey method for obtaining botanical data has required the development of a detailed analysis technique to support the historical research by Stephen Moorhouse. This is the SPACES analysis method (see Appendix 219.2). This approach of extracting information on the location and distribution of species better informs the interpretation of the botanical evidence in its historic context.

3.2. HEDGES recognises that there are a number of elements or aspects that can inform about the history of hedgerows. The investigation into the history of the current stock of hedgerows requires the multi-disciplinary approach adopted by this research project. There are fundamental drivers behind both the layout of hedgerows in the landscape and what they contain in their botanical species composition.

Hedgerow layout

3.3. The alignment and botanical composition of hedgerows is determined by:

3.3.a The growing conditions - hedge plants can only grow on suitable soils and can only contain the species that can physically grow at a given location. These can be species that have naturally colonised to that location since the last glaciation, but could also contain species that are able to tolerate the conditions even though they have not reached the area as natural colonists. Hedges can only be created across land that will support the native and introduced species whether encouraged or planted.

3.3.b The needs of the community – the community significantly determines and affects the position and alignment of hedgerows as well as having the capacity to control the species present for different purposes. This control ranges from the large landscape scale of defining townships and coaxial fields[3] to the internal level of laying out hedges along lanes and creating field systems. Hedge creation will use both native local species and introduced species to fulfil their requirements. Early hedges will be expected to comprise locally available species that were

[3] Boundaries believed to date from the bronze age when extensive large enclosures were created, often with banks and ditches, but also with walls and potentially hedgerows.

collected and used as hedging plants. Some later hedges may have introduced non-local species to fulfil a specific role that native species could not do. More modern hedges have been planted from nursery-grown stock.

3.3.c Natural features and constraints – streams and rivers, for example, form natural boundaries and are often hedged, and many hedgerows are aligned and shaped to respect these natural features.

Hedgerow species

3.4. Historically the local landscape would have contained species suitable for creating hedgerows. Species like Hawthorn *Crataegus monogyna* are universally common where hedgerows are planted and this species makes an excellent stock-proof barrier. Hedgerows would have been formed to take account of how our ancestors wanted the landscape to be divided up. This would have allowed for different species to be used in different locations dependent on the local conditions. Overlaid on the natural occurrence of species would be a desire to actively encourage some species to provide a resource that the community could use and harvest, for example fruits or timber etc. In order to tease out what has happened in the landscape in the past it is necessary to look at various elements to formulate an understanding of which forces have been at work in shaping the current hedged landscape.

Hedgerow interpretation

3.5. The two broad sources of information used to interpret hedgerow history are Recorded evidence and Botanical evidence. Within these, the elements to consider are:

3.5.a Recorded evidence

- Documents
- Maps

3.5.b Botanical evidence

- Hedge shrubs and their management
- Hedgerow trees, their management and their dead stumps
- Ground flora, especially woodland species
- Climbers

Documents

3.6. Stephen Moorhouse has researched the documentary evidence. This provided the background and context for the

interpretation of the botanical data. This has enabled him to propose chronologies for both Dunnington Township and Grimston. He has identified phases to land use change that may have had associated hedgerow planting activities.

Map evidence

3.7. The origin of the configuration of the hedgerow networks we see today has been created by our ancestors who imposed or adopted species on the landscape. The hedgerows contain species that reflect either the needs of the community (actively planted or otherwise encouraged) or a natural colonisation that was accepted by our forebears.

3.8. Over time the number of hedgerows has changed and also, in some cases, their alignment. In many areas of the country considerably more hedgerows have been formed in the relatively recent past of the last 200 to 300 years. This corresponds with the time of the Parliamentary enclosures. Previous to this private agreements and other enclosures will have taken place and may have been hedged. The general view is that in the medieval period much of the landscape was largely un-hedged as the 'open field system' of agriculture pertained and most of our current hedgerows have been created since that period.

3.9. The alignment and shape of hedgerows may stem from a very early period when coaxial field systems were created that could be pre-Roman in origin. The size of enclosed fields would have been important to our forebears. Why fields were of a particular size and shape we may never know, but the effort of creating hedges means that the field pattern is almost certainly not accidental, but part of a planned and evolving farming system through time. Some hedgerows, field sizes and shapes may have been constrained by local difficulties of growing conditions or landscape features like meandering streams.

3.10. The 1st ed. OS maps are the earliest systematic and countrywide mapping that essentially shows the legacy of the enclosure landscape that evolved out of the medieval open field system by both private enclosure and Parliamentary awards. This mapping also pre-dates the post-war encouragement to increase field sizes by removing hedgerows. This process was driven by the increasing size of machinery making it more efficient to have larger fields to operate in.

3.11. 1st ed. OS mapping also contains useful information about hedgerows in the landscape. The 1st ed. 25 inch OS map

show which side of each township boundary any hedgerow is (see Oliver 1993). The dotted line is the township boundary and the solid line is the feature that could be a hedge. For example on Figure 35.16 there is an annotation '6ft.R.H.' (6 foot from 'Root of Hedge' - centre-line of shrub trunks) signifying the hedge is 6ft from the boundary at the west end (i.e., on the southern bank) and 6ft north of the boundary at the east end (on the northern bank). This is the only indication on OS maps that inform what the boundary is. All other boundaries marked are not annotated with their type, wall, fence, hedge etc. Other annotations include CB = centre of bank, CS = centre of stream (see Oliver 1993). These provide a clear indication of what the feature was when it was mapped.

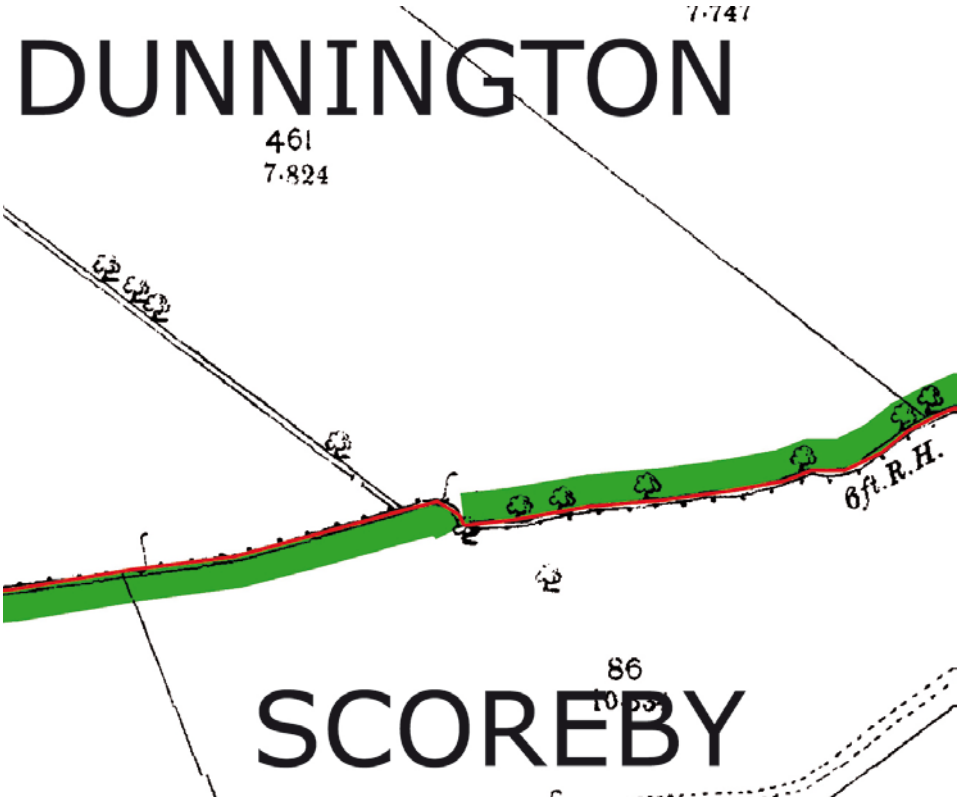

Figure 35.16 - Section of 1st ed. OS map at 1:2,500 scale showing the change of responsibility for the township boundary hedgerow. To the west the hedgerows is in Scoreby township and to the east it is in Dunnington.

3.12. This can be used to interpret the botanical evidence. The hedge ownership varies around the township boundaries. In places it is the responsibility of one township and in other places it is the responsibility of the neighbouring township. At a few locations the responsibility shifts from one side to the other

along a length of boundary as shown on Figure 35.16. On this occasion the hedgerow shifts from one side of the ditch to the other. This was probably done by agreement or mering[4] to offer watering accesses to the two townships. In this example Dunnington had access to the ditch/ stream for part of its length and the neighbouring township of *Scoreby* had the access for the rest.

3.13. Hedged lanes, roads and footpaths are especially important considerations in interpreting the botanical information in its historical context. It is essential to try and determine if a lane was hedged on both sides initially, or if it was hedged to one side initially, but became double-hedged later. In the latter instances there is a strong possibility that the current hedges do not match in terms of the species mix (Species Combination). There is also the possibility that one of the hedges may have been re-aligned. The historical documents and maps may point to the chronology and it should be possible to confirm this botanically.

3.14. Some road/ lane boundaries marked on modern maps may be slightly out of alignment with historic maps, indicating that the boundary has been straightened or altered in its relatively recent past. This is particularly the case adjacent to roads that have been straightened over time. Good examples of this occur on the Hull road east of York where there are several occasions with an old hedge to one side, along the edge of a layby loop, and the straighter and newer hedge on the opposite side of the road (see Figure 37.17).

3.15. The side of road on which this occurs varies along the length of road as can be seen on Figure 37.17. Towards the western end near the Grimston roundabout the new hedge is on the south side, and this changes to the north side further east and back to the south side etc.

[4] **Mereing** - A process where the Ordnance Surveyors negotiated with the representaives from each township to agree who would be responsible for the maintenance of common boundaries (see Oliver 1993 page 48).

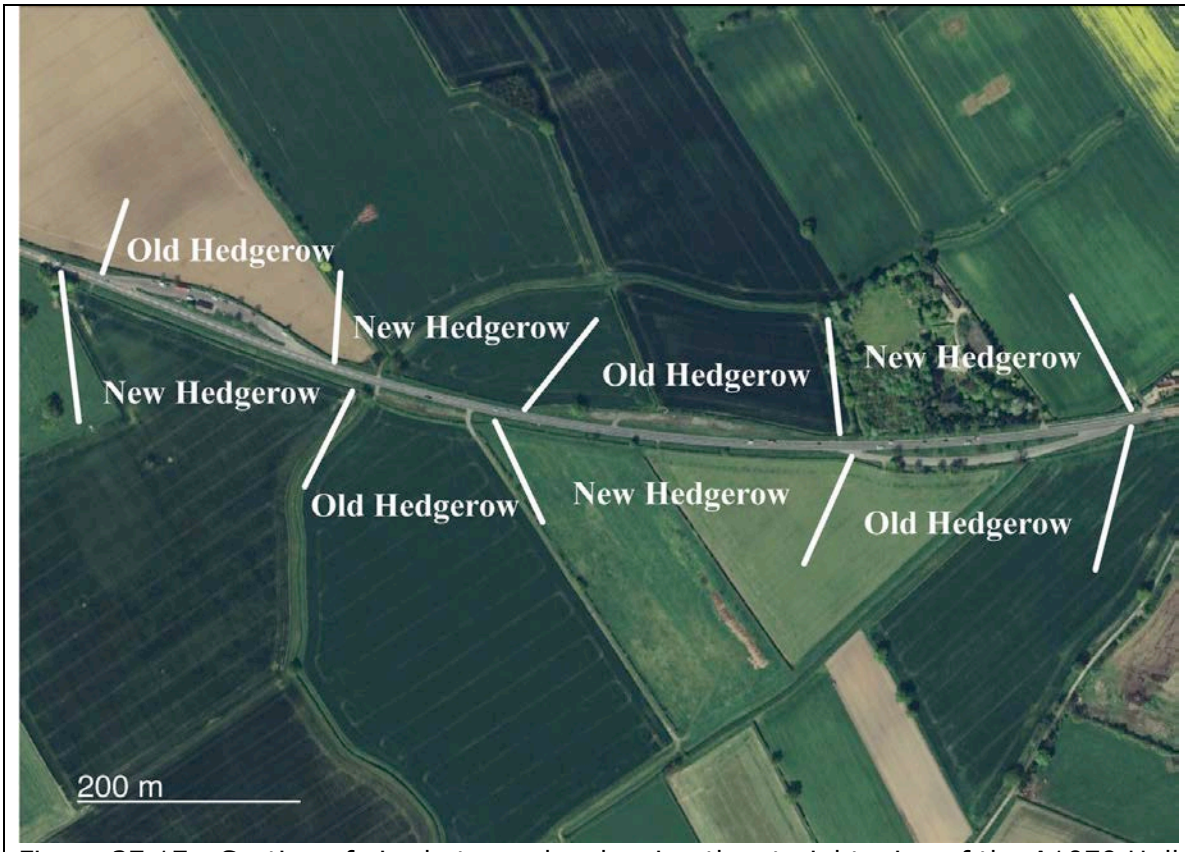

Figure 37.17 - Section of air photography showing the straightening of the A1079 Hull road where the old loops retain the historic hedgerows and the straightened sections have new hedgerows.

3.16. Although we know that the Hull road is ancient and would have been hedged for a long time, only the unaffected old sections can be said to potentially reflect that age botanically. This is why the HEDGES surveys need to be intelligently analysed and assumptions should not be made that hedges on what would appear to be ancient boundaries must also have ancient hedges on them.

3.17. The other important record of roads and lanes is the distance between the hedges. Often, in an enclosure award, there is a specification for the width in feet or yards. If this applies to the study area then it should match. If it doesn't, this suggests a re-alignment. If this is suspected, it may be possible to determine which hedge is the newer, i.e., if the lane/ road was widened, from which side and which hedge is the original.

An example of hedges being left as fragments along road/ lane sides is shown at Dunnington on Figure 38.18.

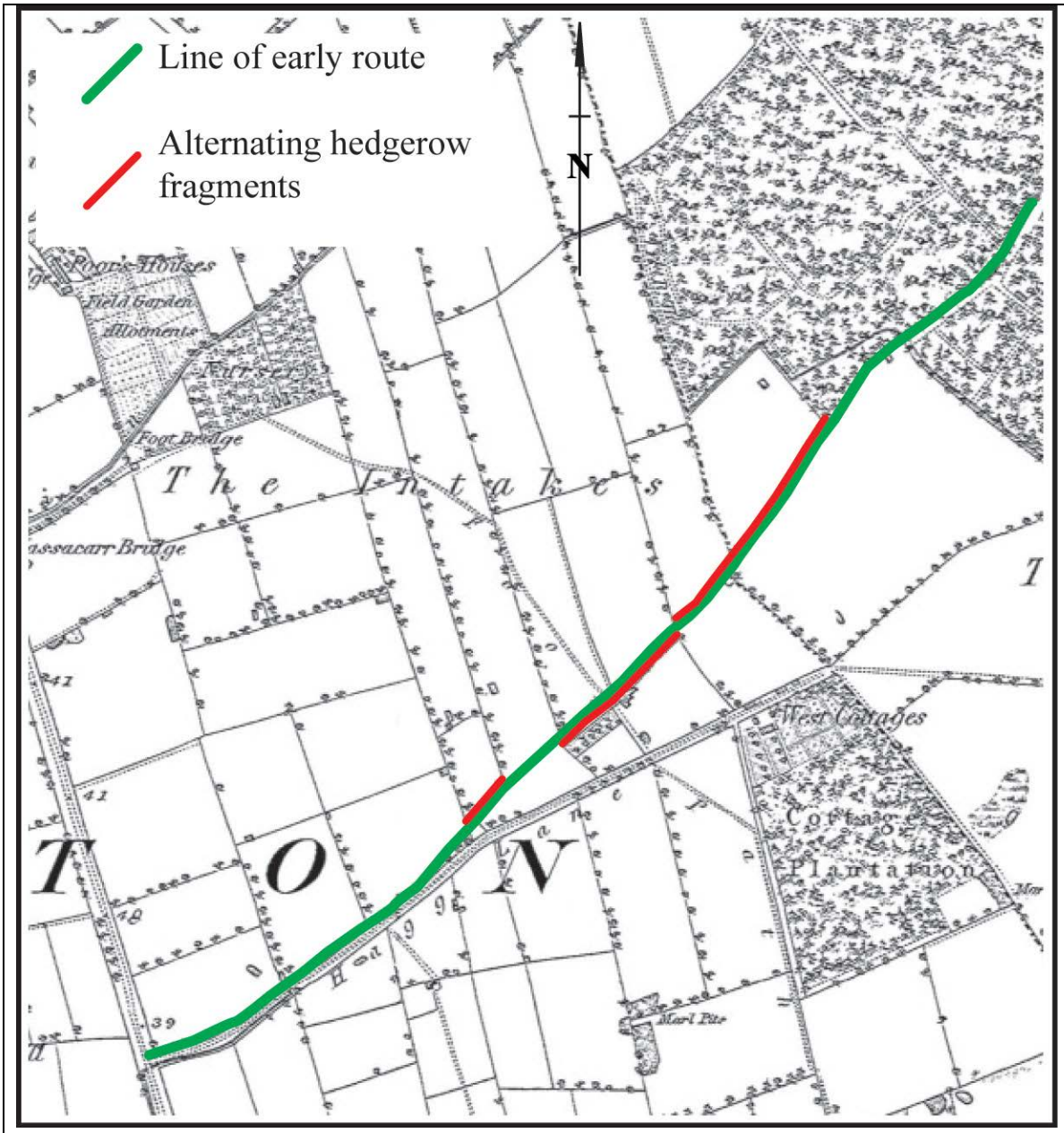

Figure 38.18 - Section of 1st ed. OS map at 1:2,500 scale showing the remaining fragments of hedgerow (Red), on that edition, retained on only one side of the former Hagg lane. The central section is now missing.

3.18. Today it is possible to identify former hedgerows by observing lines of trees on the ground, in the field or on modern maps. These often indicate remnant hedgerows. When their positions corresponds with the 1st ed. OS maps this confirms the hedge component was removed leaving just the former hedgerow trees. Such 'ghost' hedgerows will also be indicated by lines of tree symbols across open fields on 1st ed. OS maps. The 1st ed. OS maps at both 6 inch scale (1845-1850) and

25 inch (1890-1910) are the only editions to show the locations of individual trees with reasonable accuracy. It may seem a modern phenomenon that hedgerows were only removed in very recent times. But there are many instances, including at Dunnington and Grimston, where there is evidence of hedgerow removal pre-1890.

3.19. Even between the two mapping windows 1845-1850 and 1890-1910 there are differences. There are places where there are more trees on the earlier maps indicating a loss of trees and also cases where there are more on the later edition. This could indicate planting and also trees achieving a size that warranted mapping by the later mapping date. However, it could also be that the definition of the size of tree to map may have changed and small trees that were ignored during the early period would have been mapped by the later surveyors. Also, there may have been errors - some trees that must have been large enough to map, were missed.

3.20. Similar to the mapping of hedgerows along township boundaries, the trees may be positioned, but their species identification is not recorded other than the standard symbols for broadleaved and conifers. Such gaps in information could be filled in, if some of the trees remain. If these are Pendunculate Oak *Quercus robur* and Ash *Fraxinus excelsior*, then there would be a fair assumption that any trees that are no longer there would have been one of these species. But care needs to be exercised in trying to indicate the proportion of each as it is well known that Ash is more prone to lightning strike (as confirmed by the national database for lightning strikes on trees) than Pendunculate Oak Therefore an apparent abundance of Pendunculate Oak may not mean that the original planting ratio favoured Pendunculate Oak. It could be that, over time, a larger proportion of Ash trees have succumbed to lightning strike and changed the ratio from a potentially more even original planting mix.

3.21. The other indicator is to look at the hedge and see if there are tree species like Ash and Pedunculate Oak that form a part of the hedge component now. These could be the progeny of former trees, long since lost. These tree ghosts may be suggestive of the tree species that once stood nearby, i.e., if there are frequent bushes of Ash along a length of hedge that has no trees now, but had them on the 1st ed. OS maps, this would strongly suggest that those former trees were probably Ash. This would be especially so if the hedge component Ash is close to where there used to be a tree. This confident prediction

becomes less secure if there are several tree species currently in the hedge and/ or there is no apparent correlation with former hedgerow tree locations.

3.22. With all the caveats in place, the tree data from the 1st ed. OS maps are a unique and valuable tool to help interpret the tree component of the late 19th century/ early 20th century landscape.

3.23. The mapping evidence of the layout, alignment and orientation of hedgerows can be interrogated in a number of ways:

3.23.a What does the shape of a hedgerow on a map tell us about its history?

3.23.b On township boundaries - are there indications of which side the hedgerow lies, i.e., which township has management responsibilities for the hedgerow?

3.23.c What does the field size, shape and pattern tell us? Old landscape/ modern landscape?

3.23.d Are the hedgerows straight? Implying probable late creation during Parliamentary enclosure (or very early implying Romano-British).

3.23.e Is the hedgerow a 'spinal hedgerow'?, - i.e., does it run in a straight line across other features not respecting roads or streams indicating it may have been part of an early coaxial field system or followed the line of a road that has now been re-aligned?

3.23.f Which precise, or general compass direction do they follow?

3.23.g Do they run directly up and down a slope?

3.23.h Does it run parallel to one, or more other hedges in the area suggesting a former systematic alignment – e.g., a coaxial system?

3.23.i How long are the hedgerows?

3.23.j Are they curved, respecting the 'aratral' reversed 'S' of an open field strip or selion?

3.23.k Are they irregularly sinuous possibly indicating earlier formation?

3.23.l Are there ditches or streams associated with the hedgerows?

3.24. Studying all of the cartographic evidence from early maps can be interpreted to provide an insight into how the hedgescape may have developed and indicate, at a landscape level, which hedgerows could potentially be the oldest.

Botanical evidence

3.25. The botanical evidence includes both the species themselves and the age of the specimens along with their past management. This study considered the following:

3.25.a Hedge shrubs and their management - laid, coppiced etc.

3.25.b Hedgerow trees - their management and their dead stumps

3.25.c Ground flora - especially the presence of any woodland species

3.26. Climbers like Black Bryony *Tamus communis* and White Bryony *Bryonia dioica* and Honeysuckle *Lonicera periclymenum*.

3.27. The physical attributes that affect which species can naturally occur within an area are determined by the Abiotic[5] conditions that are the basic growing conditions independent of the associations and interactions with other species:

3.27.a Geology/soil -

- Type - Mineral, Peat.
- Nutrients – Rich, Poor
- pH - Acidic, Calcareous
- Moisture – Wet, Dry

3.27.b Climate –

- Rainfall – humidity
- Snow cover
- Summer temperatures
- Winter temperatures
- Wind
- Daylight hours

3.27.c Geography –

- Latitude – North, South
- Longitude – West, East
- Altitude – Lowland, Alpine

3.27.d Topography –

- Slope – Level, Inclined
- Aspect – N, E, S, W.

3.28. Species presence is also governed by Biotic[6] conditions. These attributes that can have a bearing on the range of

[5] Physical conditions of soil, water, nutrients and pH etc
[6] interactions with other plants

species that can potentially exist at a given location include shade; whether or not this is sufficient to induce shade-tolerant species like Wood Anemone *Anemone nemorosa* and Bluebell *Hyacinthoides non-scripta* etc. These Biotic conditions include:

3.28.a Shade from other species - ground flora, shrubs, Bramble *Rubus fruticosus*, trees etc.

3.28.b Competition for water, nutrient and light etc.

3.29. In some cases species can survive in a given location but may not have naturally colonised there. These are species that could have been actively encouraged or are likely to have fulfilled certain requirements or perhaps followed particular fashions of the period.

3.30. Certain species may have been encouraged at particular times in history. For example there is some evidence that English Elm *Ulmus procera* is a species associated with early hedgerows, whereas Wych Elm *Ulmus glabra* has an association with later hedged landscapes.

Geology

3.31. The underlying geology combined with the soil and moisture status of the ground largely dictates the range of species that can physically grow in the local area. It can also influence how the field pattern is laid out. In the case of post-medieval Dunnington there is a moraine that runs approximately SW-NE and the arable land and field system is generally oriented at right angles with the arable field being ploughed up and down the moraine slope NW-SE (see the geology map at Figure 9.4).

3.32. The air photo at Figure 43.19 shows medieval ridge and furrow ploughing that runs at right-angles to the moraine and up the slope. In this example the hedgerows respect the curve of the open field selions, indicating that these fields were enclosed piecemeal whilst part of the open field was still allocated to individual strip farmers.

Figure 43.19 - Section of modern air photography below Eastfield Lane showing evidence of former ridge and furrow cultivation at right-angles to the moraine.

3.33. Geology combined with geography and topography help create a candidate list of species that can be regarded as locally native to the particular area of study. Occasionally 'alien species' may be introduced that do not normally grow on the local soils and will survive, and possibly even reproduce there.

3.34. Geology can help to interpret the landscape layout of hedgerows. Geological boundaries may have been detected by our ancestors who then marked these with hedgerows, separating areas with different soils or growing characteristics. This occurs at Dunnington where there is a geological boundary that runs between Undergate field and The Ings (see Figure 9.4). This is the line between blue/yellow from the village to the A1079 at Grimston Hill House. This interface between geologies is picked out by the medieval open field boundaries.

Climate

3.35. Many species are sensitive to climatic conditions and are restricted to favourable areas. Moisture loving species are more prevalent in the wetter, western parts of the country. Species intolerant of the cold in winter are either confined to the southern parts of the country, or to lower altitudes. Species like Guelder-rose *Viburnum opulus* (see Figure 44.20) and Wayfaring Tree *Viburnum lantana* (see Figure 44.21) show this type of distribution.

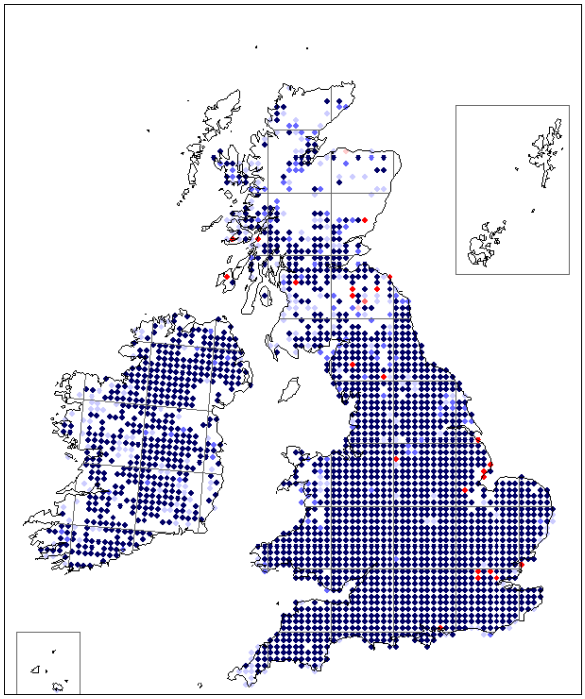

Figure 44.20 – National distribution of Guelder-rose *Viburnum opulus* showing northern extent and its presence in uplands.

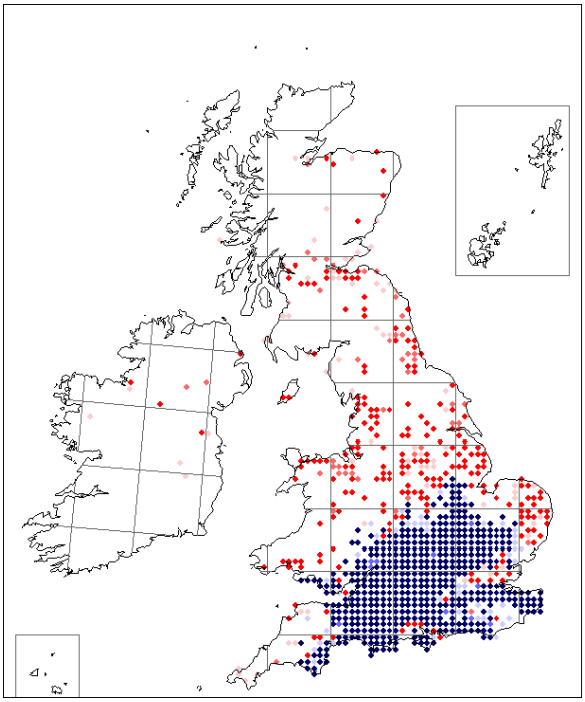

Figure 44.21 – Distribution of Wayfaring Tree *Viburnum lantana* showing its southern and lowland occurrence

Geography and topography

3.36. The location and altitude of the study area will also contribute to the range of species that can be expected to be present naturally, or can be introduced. A number of species like Wayfaring Tree *Viburnum lantana* and Wild Privet *Ligustrum vulgare* are species normally found in southern parts (see Figure 168.70). But, as already said at paragraph 1.37 (on page 12) these species can be planted in the north and will survive to confound hedgerow historians.

3.37. The undulations and slopes, or topography, of the landscape dictate that some hedgerows run up and down slopes

or maybe along the interface between sloping ground and level and/or wetter ground, e.g., between the arable and the wet ings meadows delineating different soil types.

3.38. At the local topography level the hedge may be on a bank that may have been formed as part of a historic boundary creation or resulting from the creation of a ditch to aid drainage. This can influence the species planted on such structures. The ditch itself may be wet and our ancestors may have planted wet-tolerant species like Alder *Alnus glutinosus* and willows for their individual properties.

3.39. Some banks have been created by natural or semi-natural processes. In *Scoreby* there is a north/south hedgerow on a bank caused by sand-blow accumulation. On slopes where a hedgerow runs along the contour there is a tendency for soil to be lost from the down-slope side and accumulate on the up-slope side, especially in arable fields where cultivation mobilises the soils to wash down from or towards the hedge bottom on the upslope side.

Shade and competition

3.40. Other factors can affect whether a species can be expected in a locality. Species intolerant of full sunlight will only be found if there is a shade-casting canopy. Hedgerows are effectively linear woodlands and cast shade that can encourage and retain shade-tolerant ground flora species like Bluebell *Hyacinthoides non-scripta*. The presence of such species today can indicate that shaded conditions have been provided by a hedge for a considerable period.

3.41. There are reports of slow colonization rates of some of woodlanders down hedgerows that adjoin woodland. Rates of spread, vegetatively, as slow as 11cm/year are quoted for Dog's Mercury *Mercurialis perennis* (11m per century) (Hooper, in Pollard, Hooper and Moore 1974). Hooper studied hedgerows that ran north and south of a wood with Dog's Mercury in it. To the north, hedgerows aged at 200yrs had Dog's Mercury running 25m along them (25yds/200yrs = 11cm/year) and the hedgerows to the south aged to be >300years-old had Dog's Mercury for 100m (100m/300yrs = 30cm/year). Although one hedgerow to the south had Dog's Mercury along its entire length. A hedgerow with a good population of woodlanders along its entire length now could have retained these from ancient times (when the environment was more scrubby or wooded) or acquired them from progressive colonization over a very long period. Hooper's hedgerow with Dog's Mercury along its entire length may be an example.

3.42. There are cases where colonisation rates have been observed. Near Bickerton in West Yorkshire there are hedgerows that join an old hedgerow. These are new and can be dated to around 100 years old as they are absent from the first edition OS maps of 1910. Dog's Mercury extends along these for 15m = 15cm/year

Interpreting the current species composition

3.43. Hedges present today almost certainly don't have the same species mix, in the same proportions, as they were when first created. The dynamics of hedgerow species composition need careful consideration to determine with what species a hedgerow was planted and whether this mix is diagnostic in dating the hedgerow's creation time (see Figure 12.5 and Figure 13.6).

3.44. Using confirmed botanical evidence it should be possible to disentangle the palimpsest of hedgerow formations through time. As an example, a hedgerow could be in an area, identified from historical research, that was enclosed at a particular time, say 1709. The logical assumption would be that the hedge was created at that time and that the species found today will largely reflect the original planting. But there are other scenarios that could affect the species and their abundance today.

3.44.a There was already a hedge there in 1709 and therefore the species mix will reflect an earlier planting or formation.

3.44.b The hedge created in 1709 was removed and re-planted subsequently and the species mix is evidence of a different planting mixture from the one that would have originally been planted.

3.44.c Selective removal or additions have been made to either of the above scenarios. An ancient hedge or a post-1709 hedge could have become gappy and the gaps planted with a range of different species.

3.45. Natural extinctions and colonisations could have altered the species combinations and abundances that reflect the local availability of species, i.e., the hedge may be next to a wet area and a gap could become colonised by a moisture demanding species like Grey Willow *Salix cinerea* If a hedge from the same creation era was on drier ground Grey Willow would not be present and another species, say Hazel *Corylus avellana* could be the colonist.

3.46. These scenarios will confound any attempt to correlate historic dating with the species we see today.

3.47. Hedgerows are dynamic and in many cases have had long periods in which to develop their current floras. Since their original formation many forces could have been at work to change both the range of species present and their abundances (see Figure 12.5 and Figure 13.6). This is why it is crucial to record abundance values for all species present in a hedgerow. Some of the influences that can have affected the species composition in a hedgerow are:

3.48. A species may be more abundant now because it has a competitive edge, e.g., Holly *Ilex aquifolium* is evergreen and appears to advance along a hedgerow shading out other species, or Blackthorn *Prunus spinosa* that seeds and suckers to form a forest of seedling that can exploit any gaps and become dominant.

3.48.a Less competitive species may become less frequent or abundant as they succumb to the more competitive species around them.

3.48.b A species may have been actively removed, such as Barberry *Berberis vulgaris* that was found to be a secondary host to a rust fungus that attacked wheat, or Elder *Sambucus nigra* that was viewed as having no value as a hedge plant and was systematically removed.

3.48.c Gaps may have formed over time and these may have filled naturally with local species or an opportunity taken to introduce a desired species. Some species like Elder *Sambucus nigra* and Bramble *Rubus fruticosus* have a tendency to be deposited by birds at the edge of gaps and colonise inwards to eventually fill the gaps if other species don't establish in the meantime.

3.48.d Potentially our ancestors may have actively removed undesirable species like Elder *Sambucus nigra* and then replaced them either with an existing species like Hawthorn *Crataegus monogyna* or with a different species like Crab Apple *Malus sylvestris*.

3.49. If there is little, or no, documentary or mapping evidence to inform about the history of the landscape, it would be advantageous to consider the current species in the surviving hedgerows in order to inform about their origins and past management. HEDGES looks at the entire length of each hedgerow and focuses on some of the rarer species that appear; they are indicative as historic markers of different eras

of hedgerow formation and as indicators of past management. Current approaches to interpreting the history of hedgerows rely on analysing data obtained from counting the number of woody species in 30m lengths of hedgerow. The HEDGES method does not follow this system.

SPACES Analysis Method

3.50. The method of analysis looks at the botanical data from two perspectives, individual [S]pecies and the [C]ombination of species within both individual hedgerows [H[7]] and across the landscape [L[8]]. It is based on the four SPACES elements listed at paragraph 1.10, [S]pecies, [P]osition, [A]bundance and [C]ombination. It is the consideration of the combinations of these elements that forms the basis of SPACES analysis with the addition of [T]ime and [M]anagement. This is fully described at Appendix 219.2.

Time

3.51. This study has benefitted greatly from the input from Stephen Moorhouse which has identified phases for probable hedge creation that can also be located in the landscape. This has enabled the production of the Phase maps at Annex 5. This automatically adds the time element to the SPACES analysis. Species and combinations that show a landscape pattern can be assigned to phases to correlate species presence with historic origins. For example a species might be only on identified hedgerows that are believed to be medieval boundaries like [DU-2] and would be a [T][SP][L] species.

3.52. The application of history (time [T]) to SPACES analysis has been used in the nearby medieval township of *Scoreby* and has revealed much about the historic context of hedgerows in that township. In particular, it identified that Purging Buckthorn *Rhamnus cathartica* was located at only three locations, all on the township boundary and nowhere else. It was also of interest that where it occurred, it was within 30m of the end of a hedgerow. These records would have been systematically missed by other currently accepted survey techniques that advocate ignoring the first and last 30m section of each

[7] Abundance at the hedgerow level considers both frequency - how many bushes/ plants, and abundance - how much of the species is there where it occurs?
[8] At the landscape level abundance relates only to frequency - how many hedgerows does a species occur on?

hedgerow. This emphasises the need to interpret species presence, abundance and location carefully.

3.53. The other aspects of SPACES analysis are also crucial to the interpretation of botanical data. In particular the abundance of species both within the landscape and along a hedgerow can inform about history and management. Counting species in 30m lengths does not account for the number of plants in that section, it could be a species present as a single plant or as a dominant component. Recording six species in a 30m section conveys little information compared with assessing the relative abundances of all species along entire hedgerow lengths as HEDGES does.

3.54. Hedgerows are very dynamic in their nature. Some of the hedge shrub species can become aggressive and can eventually dominate hedgerows, or large sections of them. Species like Holly *Ilex aquifolium* and English Elm *Ulmus procera* are good examples as well as, to a lesser extent, Blackthorn *Prunus spinosa* and Dogwood *Cornus sanguinea*. So, the simple Hooper rule of expecting hedgerows to become more diverse with age is confounded by the possibility that they could equally become less diverse and dominated by a single species over time. This has been observed both in the Dunnington hedgerow survey and also in the earlier survey in the adjacent medieval township of *Scoreby* with English Elm *Ulmus procera*.

3.55. The general expectation is that hedges will become more species rich and evenly populated by a range of shrubs. In a natural process as individual plants die they will be replaced by seedlings or suckers. The replacement may not necessarily be the same species as the one lost, and therefore the hedge could become more diverse than the original, which could possibly have originally been a single species hedgerow. This is presumed to be the assumption that Hooper made with the conclusion that this occurs regularly to a calculable timetable.

3.56. This dynamic shift in the number of species and their relative abundances should reflect in the botanical data. In old hedges no single species may be overly dominant and there are recognisable groupings of species indicating different historic origins and processes. An example would be a typical Parliamentary enclosure award hedgerow that should still be expected to be dominated by Hawthorn, with only a few additional species having colonised since the original planting (assuming it was only a single species planting at that time). This would support the Hooper theory of increasing species richness with increasing age. But, conversely there are many

examples, including Dunnington, where it is obvious that hedges were planted with many species and that the number of species present today would clearly confound any arithmetic determination of age based on a species count.

3.57. The management of hedgerows to contain a range of desired species can be confounded where ecological issues determine species composition, such as moisture and drainage. Species that favour moist conditions are willows *Salix* sp. and Alder *Alnus glutinosa*, both of which are found preferentially within the low-lying area of Dunnington Common. This area was formerly rough heathland vegetation and retains species like Gorse *Ulex europaeus* in some of the current hedgerows as a residual element of the past heathland vegetation.

3.58. Another aspect of the biology and ecology of species which occur across the township appears to be the significance of trees in the landscape. Not only were these planted deliberately as a resource and to cast shade etc., but they also show possible evidence of use by perching birds to distribute seeds of some hedging shrubs, mainly berry-bearing species (technically avichorous dispersal). It is also likely that people may have made a contribution to this. Workers in the fields are likely to have eaten their lunches under the welcome shade of trees and either discarded apple cores or imperfect Gooseberry *Ribes uva-crispa* where they sat. Or may have deposited the seed by 'other means'! This, 'Tree Theory' has yet to be investigated fully, but early observations seem to suggest that many berry/ fruit-bearing species like Crab Apple *Malus sylvestris*, Gooseberry and Holly *Ilex aquifolium* are frequently found underneath existing hedgerow trees as well as next to the stumps of former trees.

3.59. Because of the availability of the 1st ed. OS mapping it will be possible to chart the locations of former hedgerow trees and use the data collected to attempt to further refine this theory to indicate the significance and importance of hedgerow trees in the colonisation of hedgerows by berry/ fruit-bearing species like Hawthorn *Crataegus monogyna* or Crab Apple *Malus sylvestris* in particular as opposed to wind-blown seed from species such as Ash *Fraxinus excelsior* or Field Maple *Acer campestre*.

Management

3.60. In this study there were few instances where management was a consideration. The majority of hedgerows were of similar dimensions and had evidence of only a single laying event and there was no apparent pattern across the

study. Other areas studied have a high proportion of laid hedgerows that can help inform about origins and management histories. In some instances these inform about ownership at the time of laying. Most hedge-layers are right handed and push the stems down to their left. The exception may be where there is a hedgerow along the contours of a slope where the layer may have had to work from the downhill side even though this could have been in the ownership of a neighbour.

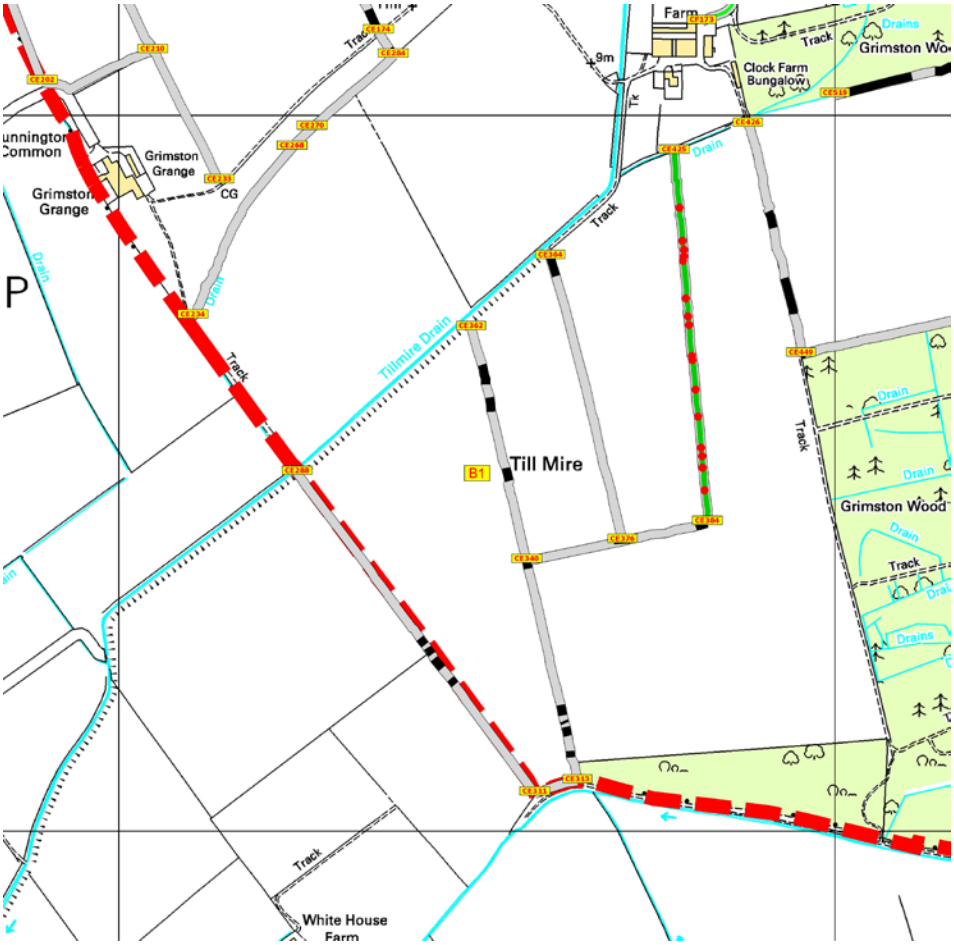

Figure 52.22 – Map of [B1] showing a significant amount of Crab Apple *Malus sylvestris* on only one hedgerow in Grimston and not on any nearby ones (created during the same phase), suggesting deliberate planting.

4. Results

Introduction

4.1. The results of the botanical surveys and analysis include a number of elements that assist in the historic interpretation of the landscape. These include the hedgerow layout as well as the species data.

4.2. The fundamental consideration for interpreting the list of species recorded is whether they are within their natural distribution or if they are introduced from outside their normal area.

4.3. The majority of species were well within their geographic ranges. Some species, like Dogwood *Cornus sanguinea*, Spindle *Euonymus europaeus* and Guelder-rose *Viburnum opulus* are getting close to their geographic limits in Yorkshire.

4.4. A total of 430 sections of hedgerow with a total length of 83.6km was surveyed during 2008 and 2009. The average length was 193m, the longest was 749m and the shortest 20m. The data is presented in Annex 7 and the field forms and field maps are included at Annex 9 and Annex 10 respectively (these are both only available on the DVD and are not printed as hard copy owing to the large number of forms and maps).

4.5. Forty shrub and tree species were recorded as listed in Annex 7. These are mapped for the whole area at Annex 7 that includes amalgamations of species like apples and Damson/ Blackthorn.

Hedgerow layout

4.6. The general layout of a large number of hedgerows is based on the moraine on which the village of Dunnington sits. The moraine forms a significant geological feature in the study area and has had a major influence in the way our ancestors laid out the farmed landscape as well as the access routes across and within the townships, respecting some ancient routeways and creating new ones to service the fields of the townships and the rabbit warrens.

4.7. Much of the mapped appearance of the area of Dunnington and its surroundings is driven by the geology and topography. The main influence of the geology has combined with the topography to determine the orientation axis of the arable fields on the moraine around Dunnington. Because the

moraine runs SW-NE at approximately 54°, the ancient coaxial field system was laid out at right-angles to it, presumably to assist drainage and plough up and down the slope. The general angle of fields in Dunnington is between 130° and 147°, i.e., 54°+90° = 144° (measured using the GIS mapping software). This accords with the coaxial field alignment described by Stephen Moorhouse. The internal field boundaries vary with location and field creation eras. Regular patterns exist across all of the medieval township of Dunnington and down across the Intakes to the Hull road.

4.8. The coaxial fields would have been set out within the pre-medieval township units and infilled with internal cultivated fields, meadows and pastures. The overall alignment would have followed the general 144° direction of cultivation over the moraine. This cultivation pattern and alignment would subsequently have been largely respected when the medieval fields were imposed on the landscape and the cultivated strips and selions laid out. This can be confidently asserted after looking carefully at the aerial photography, which shows that there is clearly a systematic ridge and furrow ploughing running over the moraine as shown at Figure 43.19.

4.9. At enclosure, the basic layout of the current internal enclosed landscape would again seem to have respected the medieval ploughing alignment of the selions and strips. The original selion alignments were unlikely to be set out with the precision of later surveyors. There is evidence that some parts were probably laid out in blocks with roughly parallel long axes. This can be seen from studying the aerial photography where hedgerows clearly follow the furrows of selions and respect the reversed 'S' curve. It may also be speculated that such strips were enclosed by early agreement whilst the strips were still being farmed. The new owners would not have been able to 'straighten' the boundaries as the strip they were enclosing would border other strips and agreement may not have been reached to effectively take some of their land as part of the deal and straighten out the 'S' as seen at Figure 43.19 where there is a curve towards the southern end that corresponds with the oxen teams being turned left at the end of the furlong onto the headland (see Figure 202.83), and were then turned around and turned right off the headland onto the next furlong. This produced a pattern of reversed 'S' strips that can still be seen today on air photography (see Figure 43.19).

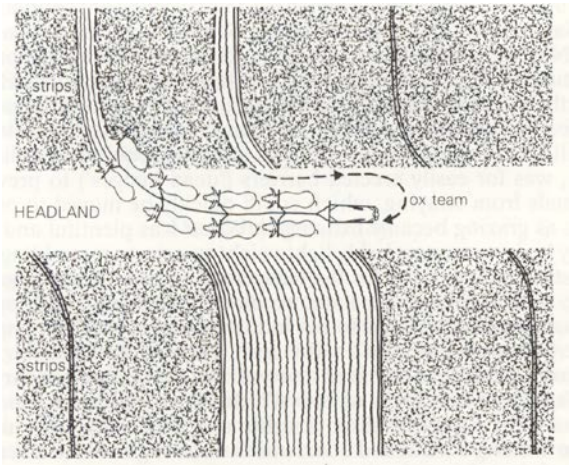

Figure 55.23 – Diagram from Dowdeswell (1987) showing how the reversed 'S' at the ends of furlongs was produced.

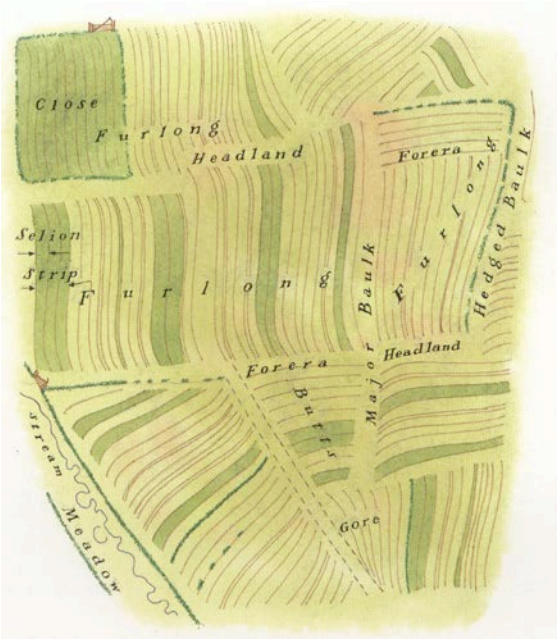

Figure 55.24 – Illustration from Rackham (1994) showing a medieval 'open field' and the reversed 'S' pattern.

Figure 56.25 - Photograph from Wikipedia showing how single furrow ploughing resulted in the formation of ridges historically when land was farmed as strips (selions) by individual tenants in an open field arable system.

4.10. At enclosure the whole landscape would have been laid out and the prevalent strips and selion boundaries are less likely to be respected except for the desire to retain the general NW-SE (144°) orientation.

4.11. The results show that most of East Field was set out at approx 130°, Thorntree Field at 140° and Undergate Field at 147°. The fields between East Field and Mill Field, north of Petercroft Lane are also oriented at 147°.

4.12. Hedge [D3][CH172-CH176] is curious in that the section that runs NW-SE crosses a number of SW-NE boundaries and runs for a long distance both ways, crossing the ditch at [CH176], Common Lane at [CH195] + [CH525] and extending eastwards across [D3][CH504-CH448]. It also extended to the west as can be seen on Figure 57.26. The hedgerows running off do not coincide across the lane/drain whereas hedge [CH172-CH176] is the only one that appears to have crossed the drain.

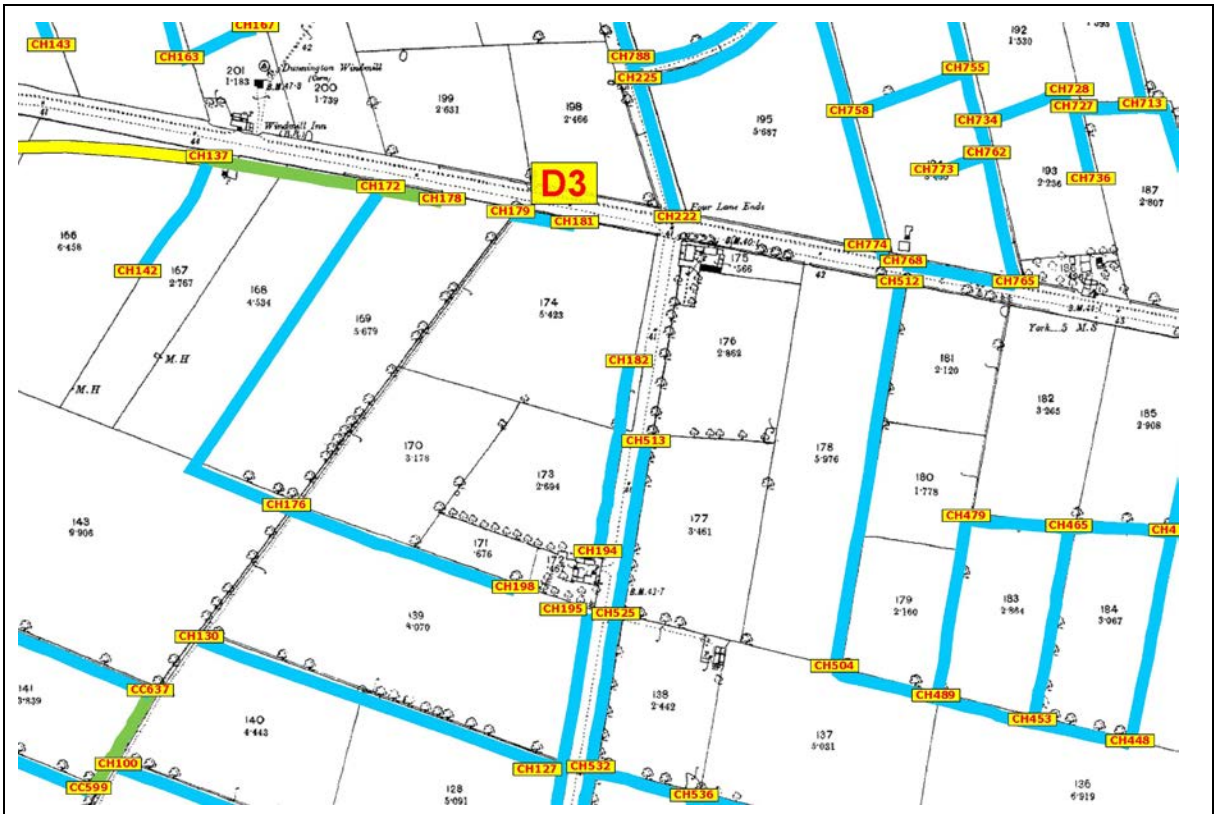

Figure 57.26 – Section of [D3] showing the possible long distance former alignment of hedgerow [CH172-CH176] that ran E-W (west now missing and intervening section east missing) to [CH504-453] and beyond to the east.

4.13. This parallelism is also seen in The Intakes that respects the Dunnington/ Scoreby township boundary alignment of 161°. This same alignment was also followed in 1772 when Dunnington Common was enclosed. The long axes of the fields south of Hagg Lane and west of Common Lane follow the same 161° alignment.

4.14. On the low-lying level ground of the former common and in Grimston – particularly on Till Mire – the alignment has largely followed the drainage system. This varies from following existing sinuous streams and watercourses in Dunnington, like Ings Drain on [C3] hedgerow [BX129-BX144], or in straight lines as on Howden Jury Drain on the same map – hedgerow [C3] [BX117-BX129].

Chronology

4.15. The research done by Stephen Moorhouse has enabled the production of preliminary chronology maps for the study area, presented at Annex 5. These show the main eras and epochs during which it is believed that the specific hedgerows were planted or created. These are provided as an overview

map and in detail, based on the 1km squares at Annex 5. Stephen has identified seven phases of development for Dunnington and four phases for Grimston. However Phase 2 at Grimston does not have any surviving hedgerows associated with that phase (see Annex 5). The overview map from Annex 5 is also at Figure 59.27.

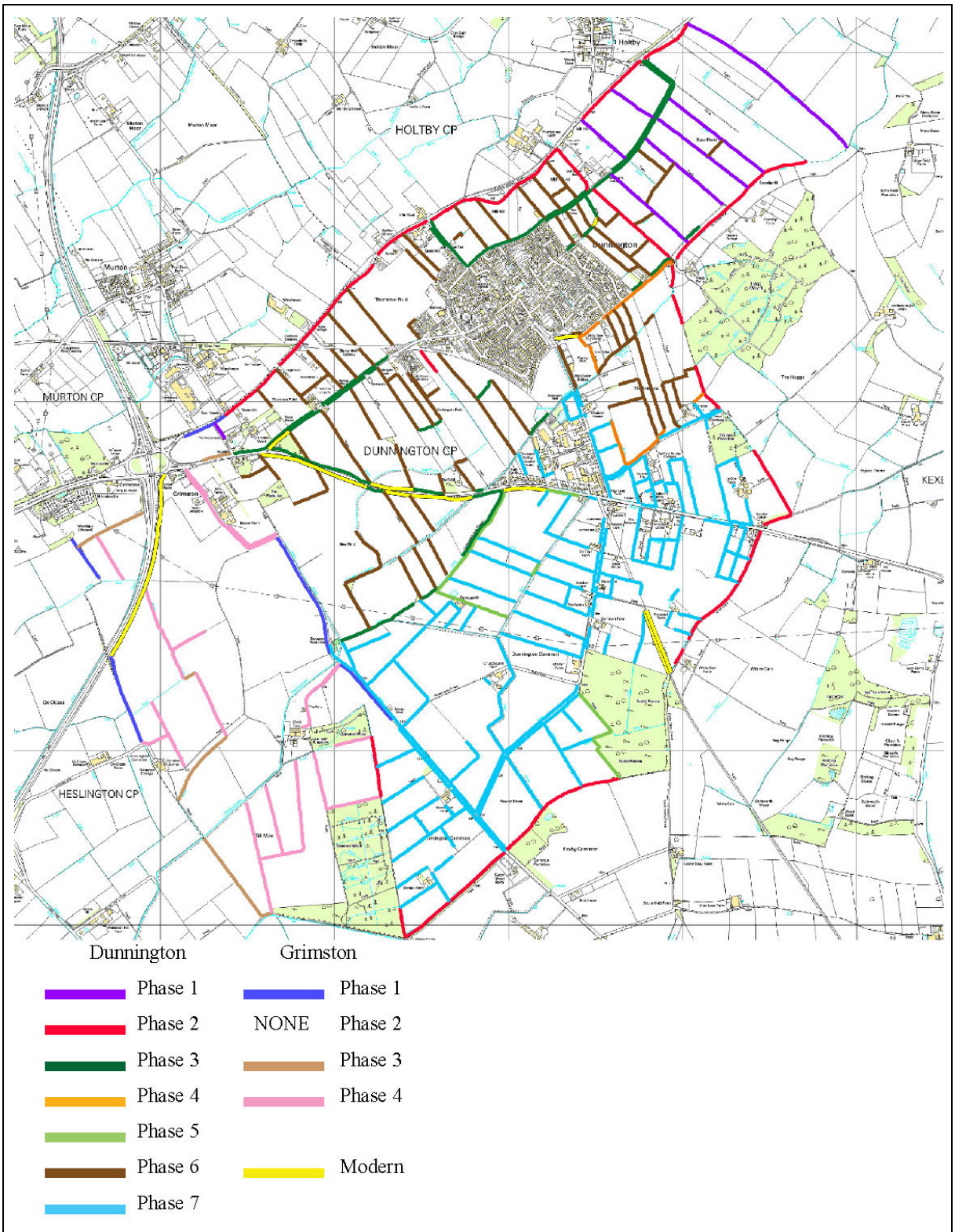

Figure 59.27 - Map of study area with phases indicated.

4.16. These phases only identify land that Stephen believes were brought into cultivation or field systems at particular times in history. This is not confirmation that all of the hedgerows within these areas were added at the time. It is likely than some hedgerows may have already been there and the new field pattern may have respected the alignment of these pre-phase hedgerows. It is also likely that some were added at a later date. This may explain some of the anomalous findings described and discussed below. Some hedgerows are almost certainly 'out-of-phase', possibly being present even before the medieval period.

4.17. In terms of understanding the dynamics of hedgerow creation within various phases of history the best analogy would be the development of housing in towns and cities. Consider a new housing development. Although it may be built by the same developer, it is unlikely that all of the houses will be identical. This will equate with the likelihood that individual farmers within given phases of hedgerow creation are likely to have created a range of species compositions based on their own personal desires and needs, even though they may have been required or encouraged to plant to a particular planting mix (such as an enclosure specification).

4.18. Once the original development was established, there will have been changes in the intervening period up to the present day. These changes will include the addition of new houses into vacant lots, the demolition and destruction of some existing housing and their replacement with new buildings. There will also be changes to the existing buildings themselves, with some owners attaching extra rooms, garages or conservatories and creating loft conversions etc. This will equate with the small-scale changes in species composition and management adopted by hedge owners through history.

4.19. Individual developments will evolve through time and new developments will begin in adjacent areas. This will equate with the phases of hedgerow creation detected by Stephen Moorhouse's historical research.

4.20. The following descriptions of the phases in both Dunnington and Grimston are provided as provisional and are taken from his work.

Phase 1 - Purple

4.21. These are interpreted by Stephen Moorhouse as being possible continuations of use for pre-historic coaxial fields.

4.22. Phase 1a - Early roads with a farming landscape of coaxial fields that were possibly hedged. Possible survivors are :

4.22.a the north hedge of Intake Lane and

4.22.b Coney garth lane (the early route).

4.22.c the east hedge of East Field on the township boundary Dunnington/Grimston township boundary down to Coney Garth lane'

4.23. Phase 1b:

4.23.a Three Roman roads that could have been hedged

4.23.b the coaxial field system would still be in use.

4.24. [DU-1] has 13 hedgerows ranging from 23m to 662m. This group of hedgerows contains a number of species that have been given the phrase of "medieval species". This is because there is a strong tendency for them to occur on medieval, or earlier, boundaries. These species include Dogwood *Cornus sanguinea*, Guelder-rose *Viburnum opulus* and Spindle *Euonymus europaeus*. Of these, the rarest is Spindle. This species was only recorded in total on five hedgerows across the study area. On three occasions they were on the historic hedgerows ranging from [DU-1] to [DU-3]. It was also recorded at [DU-6]. This was on a linear hedgerow that is speculated to have been of older origin than the 1772 enclosure of Dunnington common [A1-411]. The record for [DU-7] was a newly planted specimen on a hedgerow on [A1-410] Dunnington common.

Phase 2 - Red

4.25. The Red phase represent the fundamental medieval township boundaries. The early medieval township boundaries of *Ianulfestorpe*, Dunnington and the unnamed township with their associated open fields were located between the existing roads (see Figure 7.2 and [A5-1]).

4.26. The northern boundary of Dunnington has a significant shift at the junction between Holtby and Murton. Stephen Moorhouse believes the former township of *Ianulfestorpe* also

joined making it a 'cross-roads' of four townships (see Figure 63.28 and Figure 65.30).

4.27. West of the Holtby/ Murton junction the Dunnington township boundary runs along the north side of the A166 and the northern roadside-hedge is the responsibility of Murton, with the southern road-side hedgerows being the responsibility of Dunnington. East of the junction the Dunnington township boundary moves to the south side of the A166 and this hedgerow is the responsibility of Dunnington (see Figure 63.28). This means that the whole of the hedging along the southern side of the A166 is the responsibility of Dunnington.

4.28. In the medieval period the eastern section of hedgerow would have been created to protect Thorntree Field and Mill Field. Similarly it is likely that the Holtby side of the road would have been hedged to protect their field. On the western section on the southern side of the A166 in Dunnington, this township would have needed to plant a hedgerow along their side of the road to protect their field.

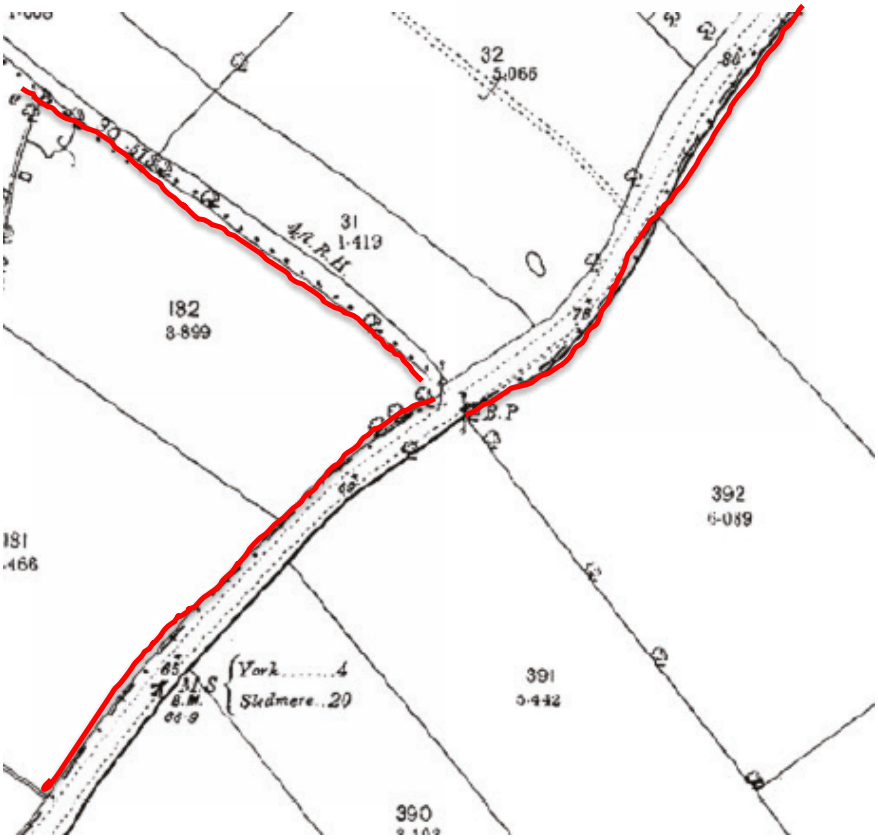

Figure 63.28 - Map showing the shift at the Vengeance Lane 'crossroads' where the township boundary with the current Dunnington changes from north of the A166 to the west (Murton) to the south (Holtby).

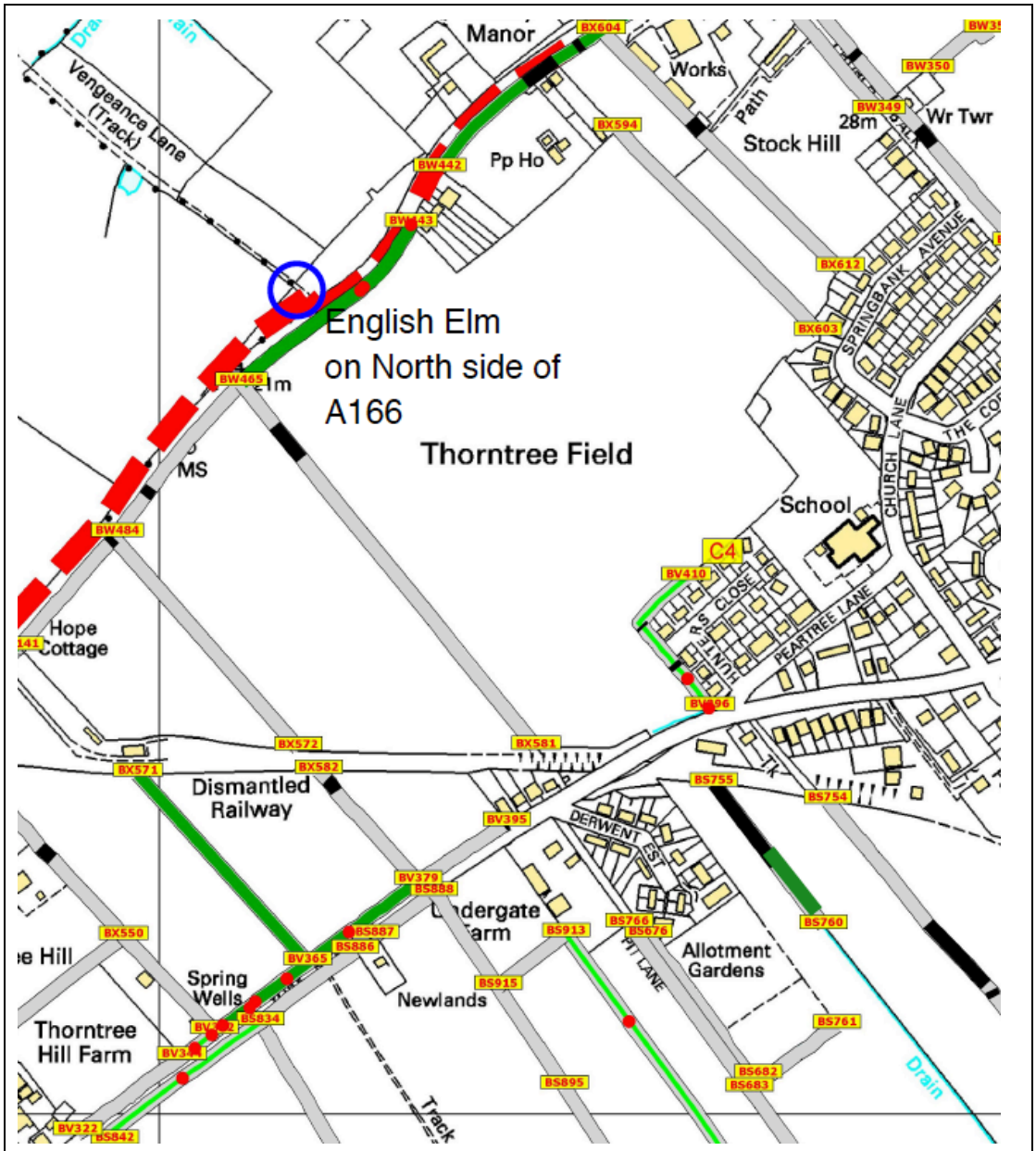

Figure 64.29 - Map showing possible confirmation of *Ianulfestorpe* as an unmapped township. The English Elm to the north of the A166 can be linked to the English Elm on hedgerow [BS755-BS760]. This hedgerow would have formed the eastern boundary of a lane that formerly crossed Thorntree Field to join up with Vengeance Lane.

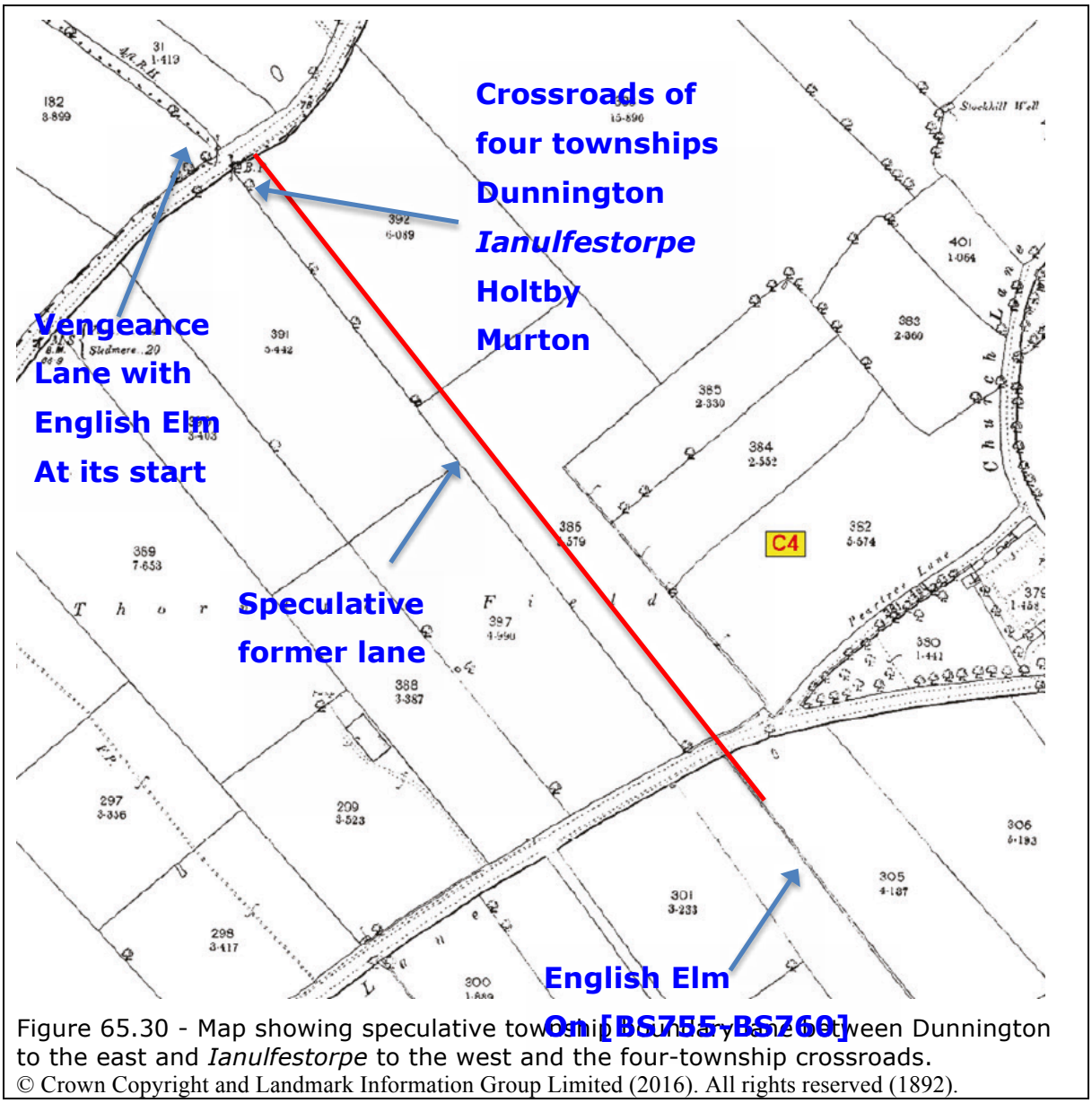

Figure 65.30 - Map showing speculative township boundary banks between Dunnington to the east and *Ianulfestorpe* to the west and the four-township crossroads.

4.29. The botanical evidence supports the presumption that the entire set of hedgerows along the southern side of the A166 are of the same origin historically. They have English Elm *Ulmus procera* and the same general mix of species, and lack species like Guelder-rose *Viburnum opulus* and Dogwood *Cornus sanguinea*.

4.30. During this phase the backbone structure was created that included the perimeter boundaries of the townships and also the internal boundaries between the open fields. Inside of this boundary field system the subsequent fields were set out each with their own bordering hedgerows.

4.31. For this phase 47 extant hedgerows were surveyed. This was the main period of hedgerow creation during the medieval (see Annex 5). The general mix of species shows evidence of those that are typical of the era in which this phase of hedgerow creation was implemented. In particular there is a significant representation of English Elm, Hazel and Field Maple (see [A7-11]). During this phase Crab Apple becomes common being found in 22/347 hedges surveyed, representing 47%. Blackthorn is also another major component being found in 27 out of the 47, 57%.

4.32. The species found in each phase are presented and summarised at Annex 7.

Phase 3 - Dark Green

4.33. The dark green lines show the internal medieval open field system. This includes the double hedging of York Road and Eastfield Lane as well as the remnant fragmentary appearance of the hedge that once separated Undergate Field from The Ings that was probably formerly a double hedged lane.

4.34. *Ianulfestorpe* and an unnamed township were consumed into Dunnington and new open fields created. During this phase the roadways between the open fields became hedged. This included the hedgerows either side of Dunnington Lane and Eastfield Lane, also the older hedgerows along the A1079. However, as shown on the plan at [A5-1] the recent realignment has taken out several sections of the older stock and replaced it with relatively modern plantings. In this phase there were 51 surveyable hedgerows.

Phase 4 - Orange

4.35. The orange hedgerows represent the surrounding enclosure of The Intakes in the late 17c that involved hedging the southern side of Intake Lane and the northern side of Hagg Lane as well as the connecting hedgerow that links the two that parallels Common Lane. The infilled hedgerows were from the 1709 enclosure period.

4.36. Only 14 hedgerows could be found and attributed to this phase.

Phase 5 - Light Green

4.37. The light green boundaries were around the Rabbit Warrens that have been difficult to date, with the presumption that Coneygarth is probably medieval and the 'Rabbit Warren' is likely to be much later. Only 13 hedgerows were available

within this phase of hedgerow creation. There were relatively few hedgerows in this phase that contained English Elm, but in those that did contain this species it was recorded as being abundant and dominant.

Phase 6 - Dark Brown

4.38. The dark brown boundaries are all in the area enclosed from the 1709 enclosure act, but that is not to say that they may not have already had a hedge on them at that time. This may have been left, or could have been replanted to comply with the rules for enclosure.

4.39. There were 86 hedgerows in this phase that were surveyed. In this phase Blackthorn was a prominent species being recorded from 69% of hedgerows and was dominant in one. This phase also saw the return of Hazel as a prominent element in the flora with it being found in 58% of hedgerows, compared with only 15% in the previous phase [DU-5].

4.40. If it can be assumed that most of the hedgerows in this phase were actually planted from 1709, then it is likely to comprehensively disprove the Hooper theory as there are far too many hedgerows in this phase that are multi-species, which would cause the Hooper rule to assess them as being more than the 300 years old that they actually are.

Phase 7 - Light Blue

4.41. The next set of enclosures date from 1772 and are coded with the light blue colour. Again, some of these may have already been hedged and simply incorporated into the enclosure plans.

4.42. This second phase of planned enclosure hedgerow creation produced 155 surveyable hedgerows. Blackthorn was slightly less evident in this phase being recorded from only 43% of the hedgerows. As with the previous phase [DU-6], Crab Apple was also a prominent feature. Hazel was considerably less evident being found in only 25% of the [DU-7] hedgerows compared with the previous [Du-6] frequency of 58%.

Modern - Yellow

4.43. The final phase is the modern set, coloured yellow. These are cases where there are clear indications that the hedgerows have been formed in the last 100 years and include the hedges on the A1079 where the road has been straightened and new hedges planted.

4.44. It also includes the hedgerows along the now disused railway line and other fragments that are clearly composed of new plants.

4.45. The modern hedgerows in Dunnington only yielded 10 hedgerows that could be surveyed. Even though they were dominated Hawthorn, there was still some species diversity in a number of hedgerows created in this phase.

Grimston

4.46. There are fewer identifiable phases in Grimston. Stephen Moorhouse has suggested a chronology.

Phase 1 - Dark Blue

4.47. Early roads with coaxial fields: possible survivors are Grimston/Dunnington township boundary and the township boundary between Grimston and Heslington north of the early route.

4.48. Very few hedgerows were created in this phase and only five survived to be surveyed in this study. Because of the low number of hedgerows, it is difficult to detect any pattern that could be ascribed to the history of the hedgerows in this phase.

Phase 3 - Light Brown

4.49. Early township boundary and planned 3 row village with associated arable field and 3b expansion infill. Again, only seven hedgerows were surveyed from this phase. No clear patterns seem to have emerged.

Phase 4 - Pink

4.50. Pre 1680 enclosure.

4.51. From this phase there were 25 remaining surveyable hedgerows. It is obvious from the surveys that rapid colonisers like Bramble can become established in these later phase developments.

Modern - Yellow

4.52. This is basically the hedgerow that forms the eastern boundary of the A64 dual carriageway that is clearly of relatively modern origin.

Species Analysis.

4.53. A number of significant species have been recorded and documented in the survey. This element of the analysis deals with what the species recorded can inform about the landscape in which they currently grow and their histories in that setting.

4.54. Each species is dealt with in turn, and where elements of SPACES analysis have been identified these will be discussed.

4.55. In this study there is a time frame for possible hedgerow creation. Therefore there are opportunities to consider this in the analysis. In particular, the combination of [SP] and [SPA] where there is a pattern of species being in historic positions (the areas covered by the phase) and their abundances in that phase [T][SP] and [T][SPA]. If there is only a position association with the phase there is a [T][SP] association and if the species has only a common abundance in the phase it will be a [T][SA] species.

Mapping

4.56. Each species is also mapped overall in Annex 6 and each 1km square map in which the species occurs is at Annex 1. One of the main reasons for presenting this publication in ring binders is that individual maps and figures can be removed to facilitate comparison. Hence this Annex is printed single-sided in the full version and the maps in the Appendices are intended to be printed single-sided.

Data sheets

4.57. The detailed species data can be found at Annex 7 for all species, in hedgerow number order. For each hedgerow there is a guide to the 1km map square(s) in which it occurs e.g., [A4-16] [BG751-BG757] is all on map [E3] as signified as [E3-E3] on Annex [A7-1]. Annex 7 also shows the data for all hedgerows surveyed from [A7-1] to [A7-7]. The data by phase for Dunnington and Grimston are on the tables from:

4.57.a [DU-1] - [A7-8]
4.57.b [DU-2] - [A7-10]
4.57.c [DU-3] - [A7-12]
4.57.d [DU-3] - [A7-15]
4.57.e [DU-5] - [A7-17]
4.57.f [DU-6] - [A7-19]
4.57.g [DU-7] - [A7-22]
4.57.h [DU-M] - [A7-26]

4.57.i [GR-1] - [A7-28]

4.57.j [GR-3] - [A7-30]

4.57.k [GR-4] - [A7-32]

4.57.l [GR-M] - [A7-34]

4.58. These tables show the occurrence of each species (columns) along each hedgerow (rows) and the number of species per hedgerow (count). These are colour graded with rare species being shown as green and more abundant species as yellow, to red for dominant.

4.59. These tables use numeric values for the DDAFOR in the cells:

11 = **RR**	21 = OR	31 = FR	41 = AR	51 = DR
12 = RO	22 = **OO**	32 = FO	42 = AO	52 = DO
13 = RF	23 = OF	33 = **FF**	43 = AF	53 = DF
14 = RA	24 = OA	34 = FA	44 = **AA**	54 = DA
15 = RD	25 = OD	35 = FD	45 = AD	55 = **DD**

4.60. The bottom rows of these tables summarise the data for each phase and indicate the minimum (green), maximum (red) and average number (yellow) of species in the hedgerows for each phase.

4.61. The species are dealt with in English name order with apples (Domestic and Crab), Blackthorn/ Damson, elms (English and Wych), roses (Dog and Field) and willows (Goat, Grey and Crack) occurring alphabetically under their main headings.

4.62. The species map sets in the Appendices and Annexes are in English name order. In the Annex 1 a species spans several sheets, e.g., Alder runs from [A1-1]-[A1-16]

Total list of species

4.63. From the total list of species, Hawthorn *Crataegus monogyna* was predictably the most frequent species across the whole study area being found on 404 of the 430 hedgerows (94%). Of the major structural shrubs, Blackthorn *Prunus spinosa* (55%), Elder *Sambucus nigra* (53%), Ash *Fraxinus excelsior* (46%) and Hazel *Corylus avellana* (38%) were also well represented across the study area. Some of the berry-bearing climbers like Bramble *Rubus fruticosus* (70%) and Dog Rose *Rosa canina* (50%) were also very frequent across the landscape.

4.64. The table at Table 75.3 shows the percentage occurrences of each species over the whole study area. This gives a visual indication of which species are most frequently found across the entire study area and also those that are in relatively low frequency (the 1st decile species).

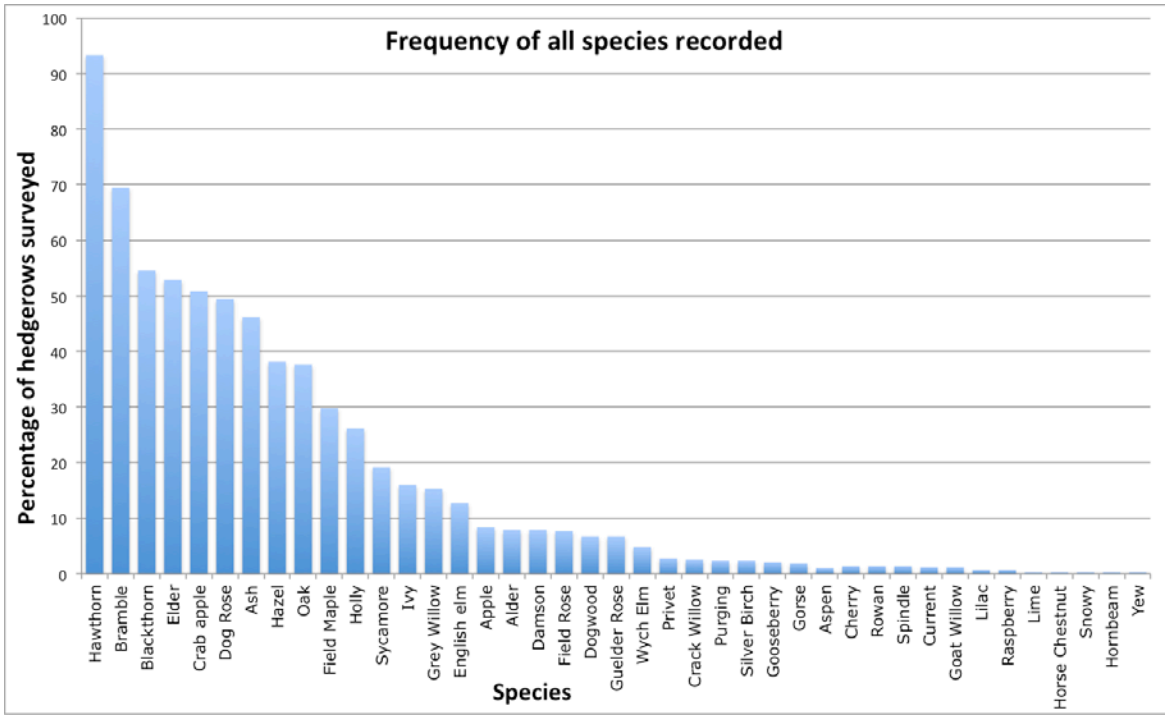

Figure 72.31 - The percentage frequency of each species over the whole study area

4.65. The maximum number of species along any hedgerow was 17 with an average of 7.

4.66. The overall abundances of each species across the entire site broken down by their DAFOR values is at Annex [A7-7].

4.67. The frequency of some species at the hedgerow level were variable and predictable, with Hawthorn *Crataegus monogyna* being more often found to be abundant or dominant and less often rare in most hedgerows, and Blackthorn *Prunus spinosa* was almost opposite -

4.67.a Hawthorn
D=27%
A=48%,
F=14%,
O=6%
R=5%.

4.67.b Blackthorn
D=2%
A=18%
F=19%
O=31%
R=31%.

4.68. Many of the 1st decile species were also tending towards low amounts in individual hedgerows. One anomalous species

was English Elm *Ulmus procera*. This was found at D=13% A=23% F=9% O=20% R=36%.
The large number of hedgerows with it present and abundant or dominant is a reflection of the aggressive nature of this suckering species.

Species by Phase

4.69. The primary aim of this research was to determine any correlation between the documented phases of landscape development. Both sets of data are now available with the caveat that there is no certainty that an area of land identified as belonging to a given phase will have been devoid of all hedgerows at that time and all of the hedgerows we see today were created in that area during that phase. Also it cannot be determined that all of the hedgerows attributable to a given phase:

4.69.a Were planted with the same mix

4.69.b Have followed the same pattern of dynamic development up to the present day. The original landowners and those that followed may have made different modifications to the mix over time.

Overall species by phase

4.70. One of the basic considerations that has been adopted by the Hooper rule is the number of species per 30m section of hedgerow. This is taken to indicate the age of a hedgerow in years based on a pure numerical count. The data from Dunnington are presented at Table 74.2. The overall trend of species-richness across time did not support the theory that older hedgerows had more species. This study did not follow the rules of the Hooper method of using 30m sections, but the whole hedgerow averages obtained are likely to give a fair reflection of the species-richness. Only [DU-1] appeared to be elevated. Even the enclosure phases of [DU-6] and [DU-7] were comparable in species compared with medieval hedgerows in [DU-2] (see Table 74.2).

4.71. Table 74.2, in keeping with the treatment by Hooper, does not differentiate which species are involved in the average species counts. It is likely that certain species may be preferential to a particular phase of landscape development. Species may be present in early hedgerows and absent from later ones reflecting changes in planting policy or changes in the availability of stock plants. Conversely, species may be absent in early periods and may be introduced in later phases.

These scenarios are dealt with earlier and are illustrated at Figure 12.5.

4.72. As hedgerows develop through time the species present can either increase or decrease in frequency and/ or abundance. These scenarios are illustrated at Figure 13.6.

4.73. This section deals with the changes in species occurrence across the different phases of hedgerow development.

Phase	Minimum No of species	Maximum No of species	Average No of species
DU-1	3	16	10
DU-2	1	17	7
DU-3	1	12	8
DU-4	2	11	8
DU-5	1	8	5
DU-6	1	13	8
DU-7	1	13	7
DU-M	1	12	6
GR-1	3	10	7
GR-3	3	8	5
GR-4	1	11	6
GR-M	3	5	4

Table 74.2 - Summary of the species richness of each historic phase.

Species in each phase

4.74. Consideration of the species present in each phase is an important aspect of this research. There are two elements to this component.

4.74.a The range of species present

4.74.b The abundance of each species present

4.75. The frequencies (range) of each species in each of the phases are at Table 75.3. This table shows that there are a number of phases where certain species are absent. It is also worth bearing in mind that the number of hedgerows in some phases are very low and that the percentage frequencies are artificially high. For example, at Grimston phase 1 there are only five hedgerows, hence a species in a single hedgerow represents 20%. In reality this is only one hedgerow out of the five in that phase. This table still indicates which species are present in each of the phases. The total at the end indicates how many species occur overall in each phase.

	Species																																					
Phase	ALDER	ASH	ASPEN	BLACK CURRENT	BLACKTHORN	BRAMBLE	CRAB APPLE	DAMSON	DOG ROSE	DOGWOOD	DOMESTIC APPLE	ELDER	ENGLISH ELM	FIELD MAPLE	FIELD ROSE	GOAT WILLOW	GOOSEBERRY	GORSE	GREY WILLOW	GUELDER-ROSE	HAWTHORN	HAZEL	HOLLY	HORNBEAM	HORSE CHESTNUT	IVY	LILAC	LIME	PEDUNCULATE OAK	PRIVET	PURGING BUCKTHORN	ROWAN	SILVER BIRCH	SNOWY MESPILUS	SPINDLE	SYCAMORE	WEEPING WILLOW	WYCH ELM	YEW	Total
DU-1		69		8	100	85	54	15	85	46		92		62	38				8		92	54	31			8			62		8				8	8				20
DU-2	2	45	2		55	66	47		57	11	4	68	26	32	2		2	2	23	13	85	43	26			6			21	4	4	2	2		2	23	2	4	2	31
DU-3		51		4	65	75	49	8	57	10		65	18	61	8		6		2	8	94	43	20	2		39	2	2	29	8	2				2	27	4	8		29
DU-4		57			71	79	57		29	14		36	21	43					7		93	79	50			64	7		43	14										17
DU-5	31	46			8	62	23	15	38		8	23	15	8					23	8	69	15	8						38				8			8	8			20
DU-6	2	51			69	67	58	5	56	13	7	58	12	57	5		3		9	9	99	58	37		1	23			37	1		1			1	12	3	9		28
DU-7	17	45	2	1	43	71	59	14	43		16	43	11	8	8	3	1	4	23	5	97	25	26			8	2	1	46	1	3	3	4	1	1	19	1	4		35
DU-M		20	20		40	60	40		30		10	50		10	10			10	20		100	10	10			20			40		10		10			30	10			21
GR-1		80			60	40	40		60			60	20	20	20				20	20	100	40				20			40							40				16
GR-3		29			86	71	29		43			57		14							100	29	14						29							14				12
GR-4	4	24			56	80	12		52		4	52	4	12	20					4	88	36	16					4	32	4	4					40	4			21

Table 75.3 - Summary of percentage frequencies for each species in each phase [T][SPA][L].

4.76. SPACES deals with the evidence from changes in species presence, frequency and abundance in order to detect any systematic differences that can be attributed to the phase of hedgerow creation.

4.77. An example of the differences in abundance of Hazel *Corylus avellana* in each phase is at Figure 76.32. This shows that Hazel was found to be more abundant on hedgerows in the earlier phases, compared with its occurrence on later hedgerows. This could equate to an evening out over time whereby a few original plants have slowly colonised and extended their range over time. However, it could equally be that, at the time of planting, Hazel was preferentially added into the mixture and has maintained a high presence up to the present day.

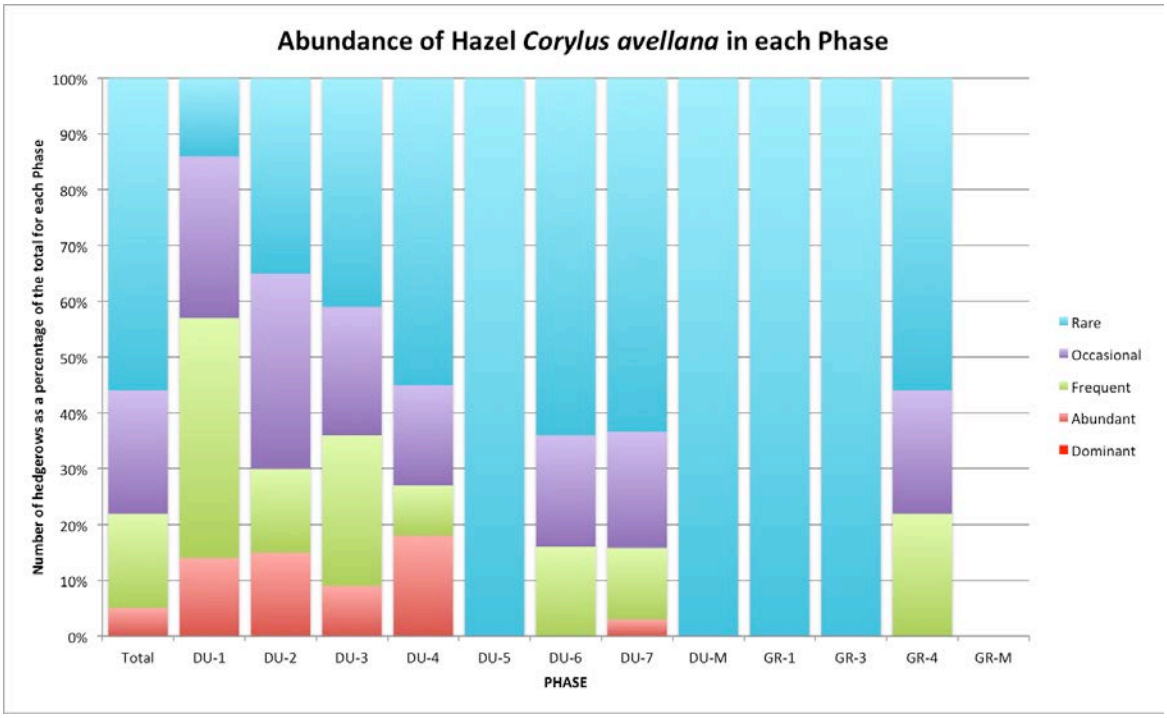

Figure 76.32 - An example chart showing the differences in species abundance in each phase for Hazel *Corylus avellana*.

Species accounts

4.78. The following species accounts present the data in terms of a table and, where appropriate, extracts from the maps [SP], a chart showing the abundances by phase [SA] and photographs.

4.79. The species [S] descriptions are partly derived from:

- www.brc.ac.uk/plantatlas/index.php?q=title_page

Tables

4.80. The data tables for each species contain a summary of the hedgerows within the study area that the species occurs on. These data produce the signature [T][SPA][L]. The explanation of the values presented are as follows:

4.81. The first column is the DDAFOR codes ranging from RR to DD.

4.82. The yellow rows are the total numbers of each broad class, e.g. Rare class = RR to RD. Going down the table there are fewer rows as a species is generally equal or more abundant in quantity that it is in frequency, i.e., a species that is Frequent would normally be frequent in terms of the number of plants, but may be present in concentrated stretches (or one plant, e.g., Holly may be a dominant stretch) that would give it a score of [FA], frequent but abundant in places. Although

Figure 218.89 indicate that combinations like [AR] are possible, it would be unusual for hedgerow shrubs to be present in low quantities at many locations.

4.83. The column headings are the Phases as described in the section on Chronology (page 57) [DU-1] - [DU-7] and [GR-1] - [GR-4]. [DU-M] and [GR-M] are the modern hedgerows, less than 30 years old.

4.84. As an example, Alder (Table 80.4) was recorded as RR in Phases [DU-5] four times, [DU-7] ten times and [GR-4] once.

4.85. This gives a total of 15 in the end column, i.e., it was [RR] in 15 hedgerows. This gives an indication of the level of abundance of the species in the whole study area.

4.86. The orange row at the bottom [TOT HGS] is the same for every table as this is the total number of hedgerows in each phase with the overall total number of hedgerows surveyed - 430 - as the total at the end.

4.87. The yellow rows for each dominance group 'No Rare' (a summation of [RR] [RO] [RF] [RA] [RD]) total up the number of times the species was recorded as Rare in frequency terms. For Alder in [DU-7] it was [RR] ten times and [RD] once, making a total of 11 occurrences when it was a rare component in hedgerows in that phase.

4.88. The blue rows beneath are the percentages for the Phase, i.e., for Alder it was recorded as Rare in 11 hedgerows in [DU-7]. From the yellow row at the bottom of the table (Total No) there were 26 hedgerows with Alder in that phase. The percentage of Alder recorded as Rare was 42% of the 26 hedgerows in that phase that had Alder. It was occasional in 3 hedgerows (12% of the 26), Frequent in 9 (35% of the 26) and Abundant in 3 (12% of the 26)

4.89. The end column totals the number of occurrences of the species at each DDAFOR abundance level for all Phases. Alder was RR on 15 hedgerows in total over the study area. It was also RD on one hedgerow in Phase [DU-7] giving a total for the Rare class of 16 hedgerows. The blue row beneath gives this number as a percentage of the total number of hedgerows that had Alder (34), i.e., 47%.

4.90. The blocks of rows for each major DAFOR frequency level break down the presence records and summarise the records in the end column. Within the 34 hedgerows containing Alder it was recorded as Rare in 16 of these (47% of 34),

Occasional in 3 (9% of 34), Frequent in 11 (32% of 34), Abundant in 3 (9% of 34) and Dominant in 1 (3% of 34).

4.91. The bottom three rows show the totals of hedgerows (yellow - TOTAL No) where it occurs in each Phase. The orange row is the total number of hedgerows in each Phase (TOT HGS) and the bottom row (blue % TOTAL) is the percentage occurrence by Phase with Alder being found in 26 hedgerows in [DU-7] out of a total of 155 hedgerows for that Phase, representing 17% of the 155 hedgerows.

4.92. Across the whole project area Alder was found in 34 hedgerows across the study area (yellow cell bottom right) out of the overall total of 430 hedgerows and was found in 8% of hedgerows in the study.

4.93. For some species accounts the table data is also presented as a graph to emphasise the signature of [T][SPA][L].

Distribution maps

4.94. The distributions maps for species, where used, are from:

www.brc.ac.uk/plantatlas/index.php?q=title_page

based on Preston, Pearman and Dines (2002).

Annexes

4.95. Annex 1 [A1] presents the data for the signature [SPA][L] and [SPA][H] as it shows the positions of a species across the landscape and within hedgerows as well as showing the frequency at the landscape level and the abundance at the the hedgerow level.

4.96. Annex 6 [A6] shows the signature [SPA][L] only, as there is no coding of the hedgerows with the abundances of species.

4.97. Annex 7 [A7] totals sheet [A7-7] presents the signature [SA][L] and [SA][H] in that it shows the overall landscape frequency of each species and the overall abundances of each species in the total number of hedgerows.

4.98. Annex 7 [A7] - total phase sheets (e.g., [A7-9]) show the signature [T][SA][L] as they present the overall landscape frequency of species in each phase and also indicate the abundances of each species in the hedgerows of that phase [T][SA][H].

4.99. Annex 7 [A7] - phase sheets show the detailed data for each hedgerow in each phase and therefore present the signatures [T][SPAC][L] and [T][SPAC][H], i.e., the [S]pecies [P]ositions frequencies/ [A]bundances and [C]ombinations across the [L]andscape and within [H]edgerows related to the phase [T].

Alder - *Alnus glutinosa*

ALDER													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR					4		10				1		15
RO													
RF													
RA													
RD							1						1
No RARE					4		11				1		16
% RARE					100		42				100		47
OO							3						3
OF													
OA													
OD													
No OCC							3						3
% OCC							12						9
FF						1	8						9
FA													
FD						1	1						2
No FREQ						2	9						11
% FREQ						100	35						32
AA							3						3
AD													
No ABUN							3						3
% ABUN							12						9
No DOM		1											1
% DOM		100											3
TOTAL No		1			4	2	26				1		34
TOT HGS		47			13	86	155				25		430
% TOTAL		2			31	2	17				4		8

Table 80.4 - Summary data for ALDER by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.100. Ubiquitous across the country. The overall distribution of this species is stable. However, a recently evolved *Phytophthora* fungus has killed 10% of trees in S. England and Wales, and may have a wider impact in the future. 0-470 m (Garrigill, Cumberland).

Growing requirements

4.101. Normally associated with damp or waterlogged conditions, but can grow in drier situations. Often grows along rivers, streams and ditches. Also frequently planted on

restoration sites because it is able to tolerate poor soils as it has the capacity to fix nitrogen in its roots.

Features

4.102. Found as both a hedge plant incorporated into the hedge management regime and as specimen trees.

4.103. It can rapidly seed into open sites, producing even-aged stands of mature trees, but seedlings are very shade- and drought-sensitive, so regeneration in woodland is often poor. It is also widely planted.

Species + Position - [SP]

[SP][L]

4.104. See [A6-3] and [A1-1]-[A1-16]

4.105. It is mainly found in low-lying, wet areas and is generally a preferred timber tree of wet areas. This species exhibits a strong [SP][L] signature linked to topography/ hydrology as shown by its presence mainly in the wetter and level parts of the townships, especially on Dunnington Common. As a coincidence it also has a [T][SP][L] signature as it was the wetter areas of the township that were enclosed in 1772 at [DU-7]. This is a coincidence as the wetter common and [DU-7] is why Alder is positioned in that phase.

4.106. This species is also on the drier parts of the moraine along local topography in ditch sides as shown on the overview map at [A6-3].

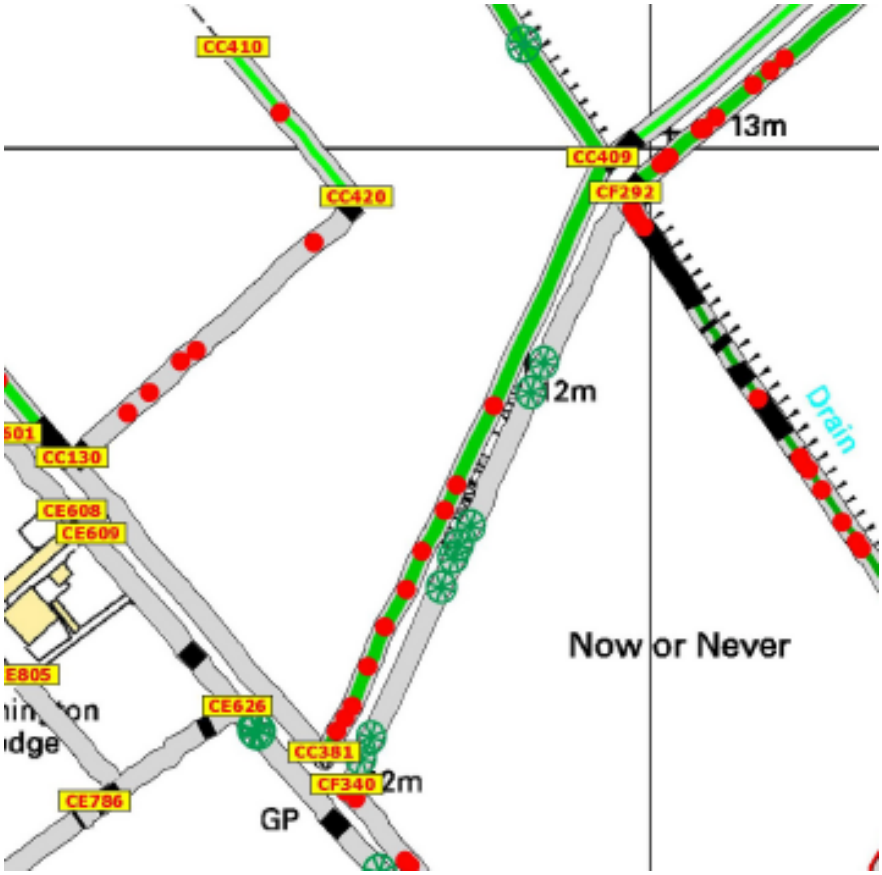

Figure 82.33 – The presence of Alder as trees on one hedgerow and as shrub on the other side of the road.

[M][SP-L]

4.107. It is present as trees along the southern end of Common Lane at [A1-5][CF292-CF340] and in the hedge opposite at [A1-5][CC381-CC409] (see Figure 82.33). It is also found as trees only on [A1-2][CE340-CE376] and [A1-2][CE340-CE362], and not found in the shrub component. The presence of Alder as a tree in the absence of any shrub component indicates that it was deliberately planted as a specimen historically. The converse of where it occurs as a shrub but does not feature as a tree might indicate that it has seeded into a hedgerow where the owner did not wish to have any trees and has consequently managed the emerging Alder seedlings as shrubs.

Species + Abundance [SA]

[SA][L]

4.108. See Table 80.4 for the abundances in all phases and [A6-3] for the frequency across the landscape for this species.

4.109. At the landscape scale Alder was present in 34 out of the 430 hedgerows surveyed, representing 8%. It is therefore relatively infrequent over the entire study area.

[SA][H]

4.110. Alder occasionally achieves frequent status along some hedgerows, and along one hedgerow west of the Rabbit Warren on Dunnington Common [A1-9][CF526-CF654] it was dominant, but generally it is at low frequency and low abundance.

[M][SA][L]

4.111. It is present in Grimston on Till Mire north of Grimston wood as a hedge plant at [A1-2][CE426-CE449]. It is generally rare in that Township.

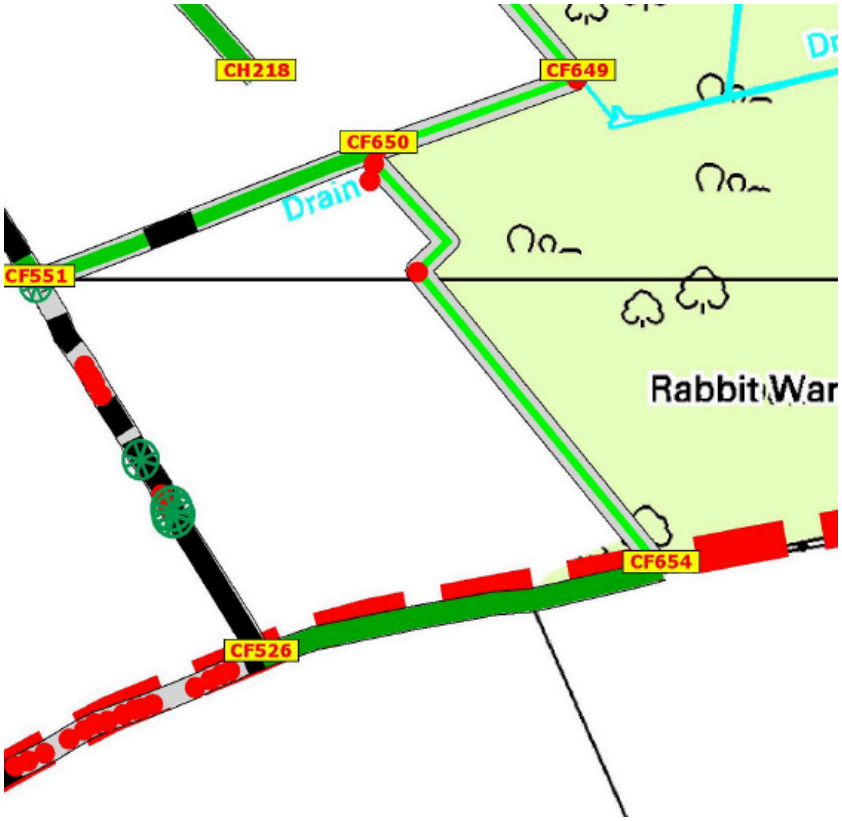

Figure 83.34 – The dominance of Alder west of the Rabbit Warren in Grimston.

Species + Position + Abundance [SPA]

[SPA][L]

4.112. [A6-3] shows the pattern of abundance for Alder across the whole study area. The individual detailed maps are in

[A1-1]-[A1-16], and their abundance across the whole study area are summarised above.

[T][SPA][L]

4.113. There does not appear to be any systematic abundance occurrence of Alder at specific positions related to historic encouragement by individuals. This species does not occur in all phases, but has a strong presence in [DU-7], the Dunnington Common enclosure area.

[M][SPA][H]

4.114. It features as a hedge plant and as specimen trees. A good example of where it occurs in both forms is in [A1-5] [CF292-CF340] as a tree and along [CC381-CC409] it is a hedge plant (see Figure 82.33). It also frequently occurs along boundaries that also incorporate ditches or streams as further confirmation of its need of moist environments. Examples are [A1-10][CC409-CC503], [CF551-CF600] and [CC409-CC471]. It is not a significant species for its uses. It has been used for making clog soles, is durable when submerged under water and makes superior gunpowder (Warren 2006), but why it is present as a tree in Dunnington/ Grimston is unknown.

APPLES

4.115. There is a good deal of variation in the type of apple found. In general the apples can be regarded as wild Crab Apple *Malus sylvestris*, but there were many instances when surveyors recorded obvious larger fruited and sweeter Domestic Apple *Malus domestica*. The planting of apples into hedgerows would be desirable for the production of cider and for other culinary uses.

4.116. Although the surveys were done late in the season, to attempt to detect the different types of plant, in some cases there was no fruit on the bushes in the hedgerows to enable exact determinations to be made. Also, many of the records for Domestic Apple were in Dunnington Common. This was surveyed in 2009 when the issue had become apparent during the 2008 survey season. Some 2008 records may not have differentiated the two in a consistent manner. This will be the focus of further work.

4.117. The data shown at Annex 1 separates the groups (Crab Apple *Malus sylvestris* being from [A1-37]-[A1-56] and Domestic Apple *Malus domestica* [A1-57]-[A1-65] and also presents data for 'all apples' [A1-17]-[A1-36] (see also [A6-19]).

Crab Apple - *Malus sylvestris*

CRAB APPLE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	4	14	15	8	1	34	39	4	1	2	2	2	126
RO													
RF													
RA													
RD													
No RARE	4	14	15	8	1	34	39	4	1	2	2	2	126
% RARE	57	64	60	100	33	68	42	100	50	100	67	100	57
OO	3	5	8		2	10	21		1				50
OF													
OA			1										1
OD													
No OCC	3	5	9		2	10	21		1				51
% OCC	43	23	36		67	20	23		50				23
FF		1	1			4	24				1		31
FA													
FD		1											1
No FREQ		2	1			4	24				1		32
% FREQ		9	4			8	26				33		15
AA		1				2	8						11
AD													
No ABUN		1				2	8						11
% ABUN		5				4	9						5
No DOM													
% DOM													
TOTAL No	7	22	25	8	3	50	92	4	2	2	3	2	220
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	54	47	49	57	23	58	59	40	40	29	12	67	51

Table 86.5 - Summary data for CRAB APPLE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.118. Present throughout England, becoming less frequent in the higher parts of Scotland.

4.119. This species is difficult to separate from the alien *M. domestica* (Domestic Apple). Confirmed records of both taxa have been mapped by the BSBI. The two species hybridise and seem to be connected by a range of intermediates. It can be difficult to separate native and alien populations, and all records are mapped as if they are native. For this report some Domestic Apples may have been put under Crab Apple, especially during 2008.

Growing requirements

4.120. No specific requirements.

Features

4.121. Although Crab Apple was probably recorded as 'the apple' in 2008, there may be cases where the plant was Domestic Apple as discussed above. But it is clear that Crab Apple was an important resource for the Townships being found overall on 220 out of 430 (51%) hedgerows surveyed.

4.122. It occurs in all phases and was significantly planted during enclosures in [DU-6] (50 out of 86 (58%) hedgerows planted) and [DU-7] (92 out of 155 (59%) hedgerows planted). This level of planting is unlikely to be the result of colonisation as suggested by Hooper.

Species + Position [SP]

[SP][L]

4.123. See [A6-20] and [A1-37]-[A1-56].

4.124. Apples were generally ubiquitous across the study area () with the exception of parts of Grimston where there was a distinct absence on most hedgerows, with hedgerow [A1-29][CE384-CE425] being the exception (see Figure 88.35). It was also remarkably absent from the township boundary between Dunnington and *Stamford Bridge West* [A1-56] and also sections of Ox Calder Way [A1-55], and the township boundary between Dunnington and *Score*by [A1-55]. This suggests that Crab Apple was not a significant species to plant on the boundaries of townships. Possibly because this area was not inhabited and therefore there was no requirement to obtain the fruits for domestic use.

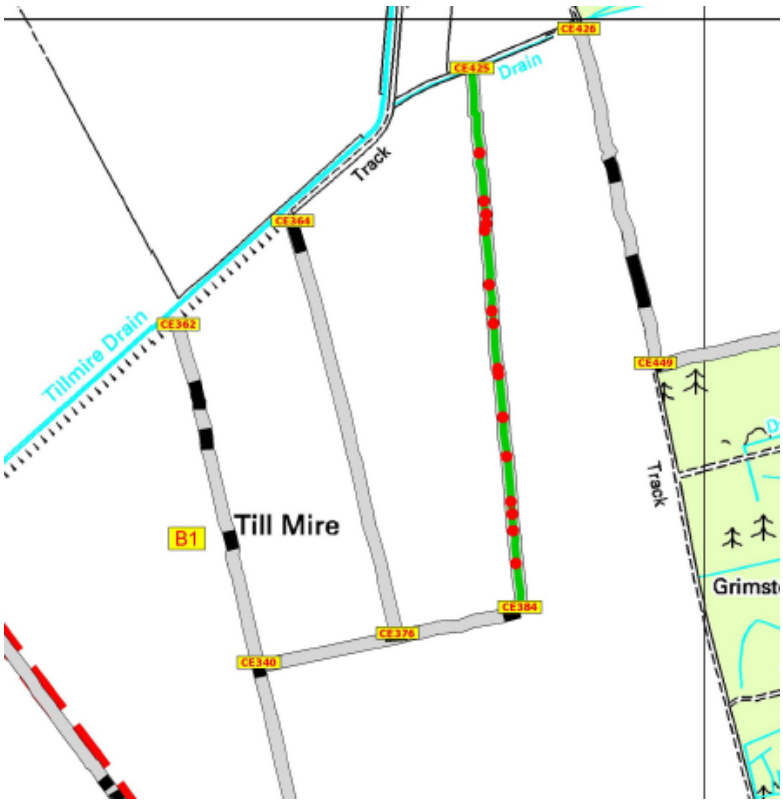

Figure 88.35 – Grimston Till Mire showing the distribution of Crab Apple.

Species + Abundance [SA]

[SA][H]

4.125. Within the project area there are variable quantities of apples occurring in the hedgerows. Table 86.5 shows the data for Crab Apple *Malus sylvestris*. This species is often rare or occasional, with some records at frequent or above, especially in the [DU-6] and [DU-7] phases. In [DU-7] it was a frequent component in 24 hedgerows or 26% of the 92 hedgerows in which it was recorded for that Phase.

Species + Position + Abundance [SPA]

[SPA][H]

4.126. The occurrence of all types of apples is likely to show trends of deliberate planting either as part of enclosure or individual landowner's preferences. This seems to be the case for [A1-39][CE384-CE425] where there were frequent plants along the length of the hedgerow, implying planting (see Figure 88.35).

4.127. Elsewhere across the study area Crab Apple varied in its distribution at the hedge level [SPA][H] often having short sections of hedgerow with a number of plants, implying natural local dispersal. Examples are at [A1-51][BS413-BS436] and [A1-43][CE735-CE763] (see Figure 89.36 and Figure 89.37).

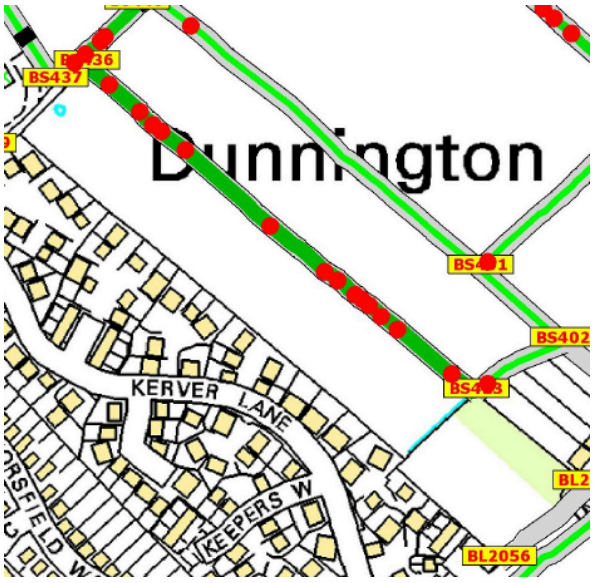

Figure 89.36 – Clumping of Crab Apple along [A1-51][BS413-BS436].

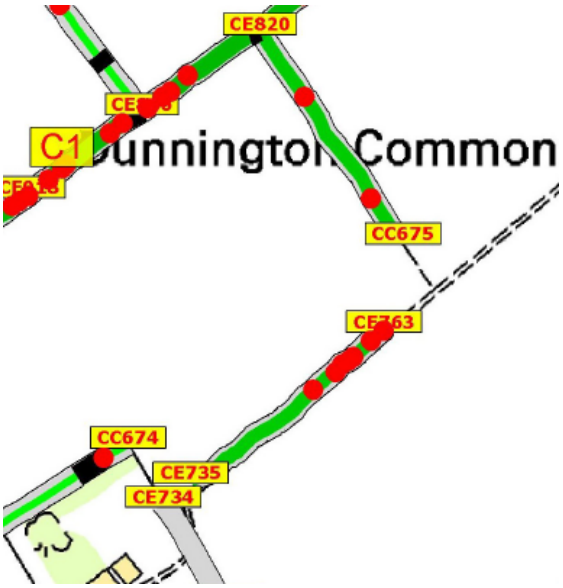

Figure 89.37 – Clumping of Crab Apple along [A1-43][CE735-CE763].

Domestic Apple - *Malus domestica* or *Malus spp*.

DOMESTIC APPLE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1			1	5	15	1			1		24
RO													
RF													
RA													
RD													
No RARE		1			1	5	15	1			1		24
% RARE		50			100	83	60	100			100		67
OO						1	8						9
OF													
OA													
OD													
No OCC						1	8						9
% OCC						17	32						25
FF		1					2						3
FA													
FD													
No FREQ		1					2						3
% FREQ		50					8						8
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		2			1	6	25	1			1		36
TOT HGS		47			13	86	155	10			25		430
% TOTAL		4			8	7	16	10			4		8

Table 90.6 - Summary data for DOMESTIC APPLE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.128. A combined map for all apples mirrors that showing Crab Apple and reinforces an absence from the higher ground in Scotland (See paragraph 4.119).

Growing Requirements

4.129. As for Crab Apple, no specific requirements.

Features

4.130. A wide range of sizes, colours and flavours of Domestic Apple was found across the study area and this will form a significant follow-up study. It is likely they will be natural

seedlings in some cases, but recognised cultivars may be present. It is this aspect that needs further investigation along with linking apple-rich hedgerows with the landowners likely to have planted them.

Species + Position [SP]

[SP][L]

4.131. See [A6-18] and [A1-57]-[A1-65].

4.132. Domestic Apples were more reliably recorded in 2009 but show no pattern for their position in the landscape [SP][L].

Species + Abundance [SA]

[SA][H]

4.133. Domestic apple is nearly always rare to occasional in hedgerows, unlike Crab Apple that was often found at levels of occasional or above (frequent).

Species + Position + Abundance [SPA]

[T][SPA][L]

4.134. The presence of Domestic Apple in hedgerows forms a major component of hedges associated with the enclosure of the landscape (1709 [DU-6] and 1772 [DU-7]). This indicates deliberate planting as it is relatively unlikely to have occurred as chance colonisation as might be suggested by the Hooper rule.

Ash - *Fraxinus excelsior*

ASH													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	5	12	16	4	4	31	35	2	1	2	5	1	118
RO													
RF													
RA													
RD													
No RARE	5	12	16	4	4	31	35	2	1	2	5	1	118
% RARE	56	57	62	50	67	70	51	100	25	100	83	100	59
OO	4	5	6	2	2	7	18		1				46
OF													
OA				1									1
OD													
No OCC	4	5	6	3	2	7	18		1				47
% OCC	44	24	23	38	33	16	26		25				24
FF		2	4	1		5	11		2		1		26
FA													
FD						1							1
No FREQ		2	4	1		6	11		2		1		27
% FREQ		10	15	13		14	16		50		17		14
AA		2					2						4
AD							1						1
No ABUN		2					3						5
% ABUN		10					4						3
No DOM							2						2
% DOM							3						1
TOTAL No	9	21	26	8	6	44	69	2	4	2	6	1	199
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	69	45	51	57	46	51	45	20	80	29	24	33	46

Table 92.7 - Summary data for ASH by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.135. Ubiquitous except for the extreme north of Scotland. The range of Ash is stable. In N. Scotland it is native on limestone and widely planted elsewhere; differentiating native from alien populations can be difficult. 0-585 m (Cwm Idwal, Caerns.).

Growing requirements

4.136. No specific growing requirements.

Features

4.137. A deciduous tree of woodland, scrub and hedgerows, especially on moist, basic soils, but also frequent on rock scars and cliffs, stabilised scree and the grikes of limestone pavement. It can tolerate periodically waterlogged soils, being

found around springs and in *Alnus* and *Salix* carr. In managed woodland it may be grown as a timber tree or coppice. It is a rapid coloniser of waste ground, disused quarries and railway banks.

4.138. Ash *Fraxinus excelsior* is present across the study area both as a tree and shrub component of the hedgerows. The species is normally present in both forms along hedgerows where it occurs, but there are a number of examples where it is present as a tree, but was not recorded as a shrub in the same hedgerow. Examples include [A1-80][BS281-BS306] (see Figure 94.38).

4.139. The converse is where the plant is in the hedge, but there are no current trees, e.g., [A1-72][CC130-CC420] (see Figure 94.39). Typical examples where both forms occur are [A1-80][BU256-BU269] (see Figure 94.40).

4.140. This is a wind-dispersed species, however, unless the wind is particularly severe, the range for dispersal is likely to be somewhat restricted. The expectation is that new trees will not be far from existing trees that are shedding seeds. There is some evidence of seedlings establishing in the hedges in proximity to existing trees in support of this supposition (see [A1-70][CE084-CE099].

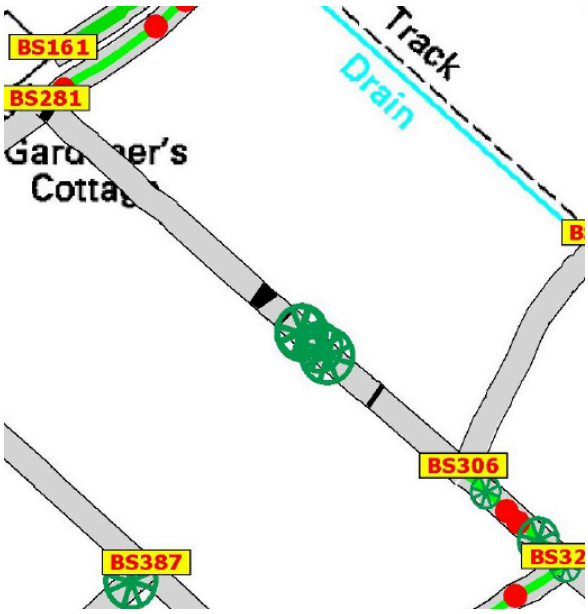

Figure 94.38 – An example of Ash as a tree only in a hedgerow in [A1-80].

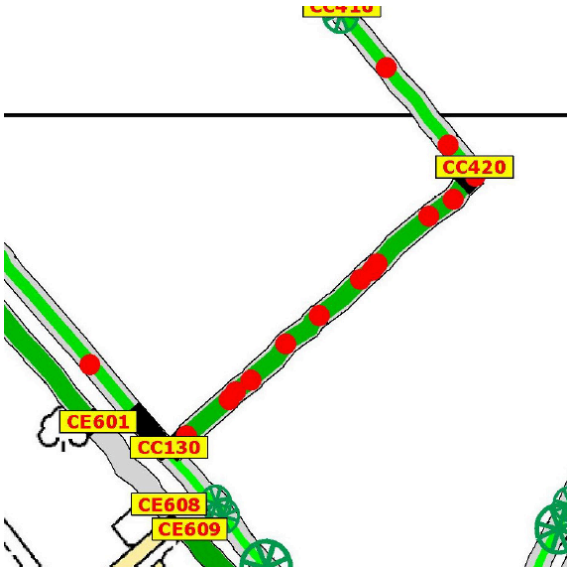

Figure 94.39 – an example of Ash only as a shrub in a hedgerow in [A1-72].

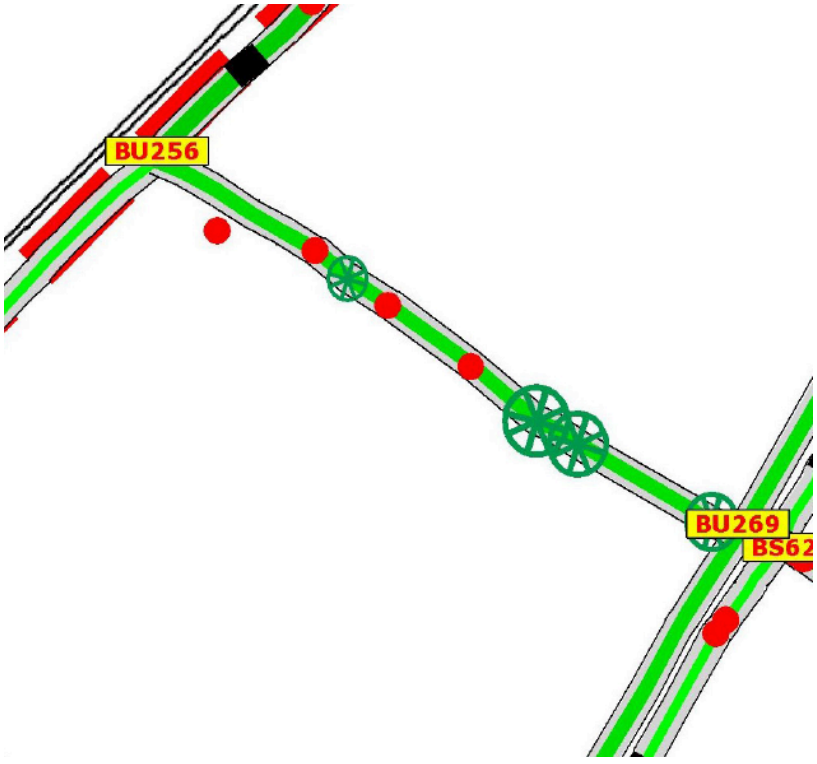

Figure 94.40 – An example of Ash as both a shrub and as a tree in [A1-80]. Note the different sizes of tree.

Species + Position [SP]

[SP][H] and [SP][L]

4.141. See [A6-14] and [A1-66]-[A1-84]

4.142. Ash is a generally ubiquitous species at the landscape scale [SP][L] and scattered randomly along individual hedgerow lengths [SP][H]. It is largely absent from many hedgerows in Grimston as a shrub.

Species + Abundance [SA]

[SA][L]

4.143. Overall its frequency and abundance is towards the rare end of the scale with few instances where it is more than frequent. It is generally less frequent in modern hedgerows, although the sample size is small. It was infrequent in Grimston and mainly as trees [M][SA][H], presumably planted, although many were small (see [A1-68]).

Species + Position + Abundance [SPA]

4.144. Ash is a typical species found in hedgerows both incorporated within the hedge and managed as a shrub and present as hedgerow trees. The treatment of this species as a tree is dealt with under a later section. The size of individual specimens is of significance as this can help to date the time of planting. This species, along with Pedunculate Oak *Quercus robur,* is the most commonly occurring tree species across the study area.

[M][SPA][L]

4.145. The current stock of trees is variable across the landscape with certain areas retaining concentrations of the species, notably to the west of Dunnington Common [A1-73]. This one kilometre square shows that Ash can be present as a tree and absent as a shrub and conversely, present as a shrub but absent from any tree cover currently in given hedgerows. There is no apparent correlation between the occurrence of Ash in the hedge component and its association with trees at the same location, indicating local seeding.

4.146. In general, the specimens of tree are relatively small in diameter and are probably contemporary with the enclosure of the landscape at either 1709 or 1772. There is a slight indication that there are more Ash trees of larger diameter in Dunnington enclosed in 1709 e.g. the NE corner of [C4] at [A1-75] and [D5] at [A1-80].

Aspen - *Populus tremula*

ASPEN													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR							2	1					3
RO													
RF													
RA													
RD													
No RARE							2	1					3
% RARE							67	50					50
OO		1						1					2
OF													
OA													
OD													
No OCC		1						1					2
% OCC		100						50					33
FF													
FA													
FD													
No FREQ													
% FREQ													
AA							1						1
AD													
No ABUN							1						1
% ABUN							33						17
No DOM													
% DOM													
TOTAL No		1					3	2					6
TOT HGS		47					155	10					430
% TOTAL		2					2	20					1

Table 96.8 - Summary data for ASPEN by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.147. Almost ubiquitous, like many trees, Aspen may have been under-recorded in the 1962 *Atlas*. It has been planted for amenity and as food for browsing deer. 0-640 m (Atholl, E. Perth).

Growing requirements

4.148. A broad-crowned tree of moist clay or sandy soils in mixed broad-leaved woodlands, hedgerows, on heathland, in disused clay- and sand-pits, and occasionally in pine woods. In the north and west, it grows on cliffs, rocky outcrops and riverbanks, often as a shrub. It suckers to form thickets, and readily colonises bare ground.

Features

4.149. A rare species found mainly in relatively recent hedgerows. Almost certainly a recent ornamental planting and of no apparent historical significance.

Species + Position [SP]

[SP][L]

4.150. See [A6-22]. There were insufficient records and no justification for mapping this species at the 1km scale as at Annex 1.

4.151. Along the disused railway and the hedgerow north of the Rabbit Warren on [A6-22]. Not related to any particular phase.

Species + Abundance [SA]

[SA][L]

4.152. Only 6 hedgerows with Aspen on were found in the study area making it a rare [SA][L] species

[SA][H]

4.153. Normally rare or occasional at the hedgerows level [SA][H], but abundant on one hedgerow in [DU-7].

Species + Position + Abundance [SPA]

4.154. The presence of abundant plants along the disused railway implies deliberate ornamental planting at this location.

4.155. This species may have been a fashionable addition to the hedgerows added at the two enclosure periods of 1709 and 1772.

Black Currant - *Ribes nigrum*

BLACKCURRANT													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			2				2						4
RO													
RF													
RA													
RD													
No RARE			2				2						4
% RARE			100				100						100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No			2				2						4
TOT HGS			51				155						430
% TOTAL			4				1						1

Table 98.9 - Summary data for BLACK CURRANT by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.156. Almost ubiquitous, but regarded as an introduced species only.

4.157. Clearly a significant domestic species of value and likely to be a garden escape.

4.158. Black Currant *Ribes nigrum* does not appear to have been cultivated until shortly after 1600 when plants were imported from Holland. It was first recorded in the wild in 1660 and occurs as a naturalised escape throughout Britain, although some have considered it to be native in fen-carr and wet woodlands in East Anglia.

Growing requirements

4.159. No specific growing requirements.

Features

4.160. The seeds of this species are dispersed by birds. Potentially this could be long-distance, but in practicality there is evidence that this is relatively short distances from domestic gardens such as on Eastfield Lane (see [A1-146]) near Dunnington Hall.

Species + Position [SP]

[SP][L]

4.161. See [A6-29] and [A1-145]-[A1-147]

4.162. At least two of the locations on Eastfield Lane, near to Dunnington Hall on [A1-146] indicate local domestic escapes from the gardens of the Hall. The other records on [A6-29] show no such affinity.

Species + Abundance [SA]

[SA][L]

4.163. Rare in the landscape.

[SA][H]

4.164. Normally as single plants scattered along a hedgerow, or the only plant where found.

Species + Position + Abundance [SPA]

[SPA][L]

4.165. There are very few records of domestic currants. These were identified as Black Currant during the surveys, and they were assumed to be of domestic origin.

4.166. This species was found in only a scattering of locations across Dunnington and Dunnington Common. The locations on Eastfield Lane in [A1-146][BS365-BS654] and [BS281-BS654] were the only ones that showed an association with habitation (see Figure 100.41). As this species is dispersed by birds, this apparent random scatter of plants is easily understood.

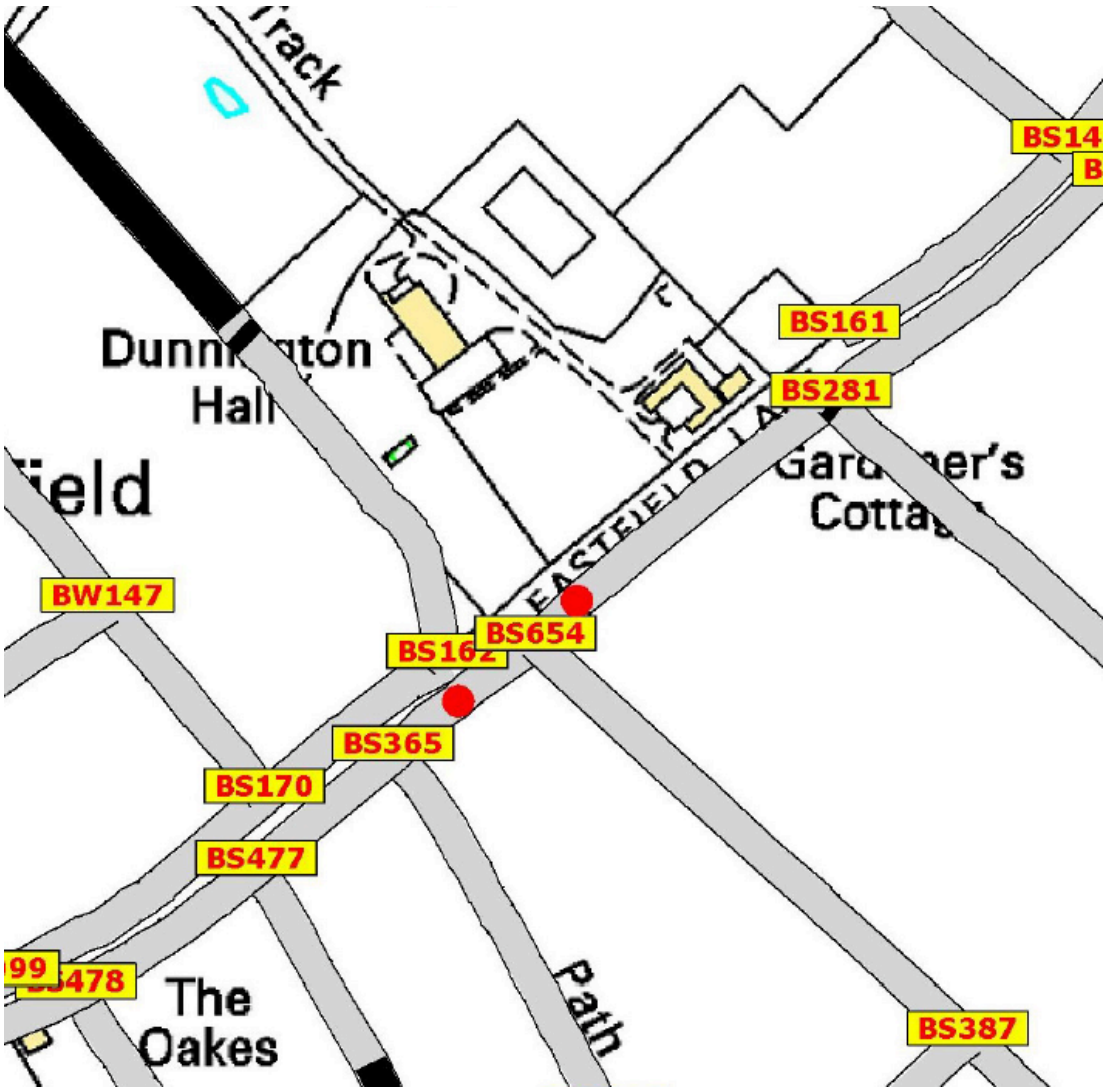

Figure 100.41 – The locations of two plants of Blackcurrant on Eastfield Lane near Dunnington Hall implying a domestic origin. These are in the [DU-3] Phase but could have colonised at any time from then onwards.

Blackthorn/ Damson/ Bullace

4.167. During the 2008 survey season it became apparent that there was a degree of variation in leaf size on what was assumed to be Blackthorn. Many plants seem to have large oval-shaped leaves and subsequently many were found to bear damsons rather than sloes. Late summer surveys make it easier to identify and differentiate the two species. Unfortunately the fruiting of both species can be variable in any given season and it is possible that some Blackthorn bushes and some Damson bushes do not fruit and therefore their identity cannot be confirmed. The data presented on the maps attempt to divide Blackthorn from Damson, but also include maps that incorporate records of both species.

4.168. The descriptions in the literature are not consistent. Damson is *Prunus domestica* ssp. *insititia* and is sweet-fruited with oval dark purple fruits. Bullace is described as rounded fruited and dark purple with either a sweet or sour taste, but not as sour as sloes. The plants recorded at Dunnington as Damson were oval and sweet. For this study the common name of Damson has been adopted.

4.169. As with the treatment of apples, the maps at Annex 1 are divided into Blackthorn [A1-105]-[A1-124] and Damson [A1-148]-[A1-162] as well as combined into Blackthorn + Damson [A1-85]-[A1-104].

Blackthorn - *Prunus spinosa*

BLACKTHORN													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	1	4	12	4		11	23	2			11	1	69
RO				1									1
RF													
RA									1				1
RD				1			1						2
No RARE	1	4	12	6		11	24	2	1		11	1	73
% RARE	8	15	36	60		19	36	50	33		79	100	31
OO	3	10	14	1		17	22		2	1			70
OF													
OA							1						1
OD						2							2
No OCC	3	10	14	1		17	23		2	1			73
% OCC	23	38	42	10		32	35		67	17			31
FF	1	4	2	1	1	7	8	1		2	2		29
FA	1	1		1									3
FD	2	2	1			6	1						12
No FREQ	4	7	3	2	1	13	9	1		2	2		44
% FREQ	31	27	9	20	100	22	14	25		33	14		19
AA	2	2	2			3	6			1	1		17
AD	3	2	2	1		12	4	1					25
No ABUN	5	4	4	1		15	10	1		1	1		42
% ABUN	38	15	12	10		25	15	25		17	7		18
No DOM		1				1				2			4
% DOM		4				2				33			2
TOTAL No	13	26	33	10	1	59	66	4	3	6	14	1	236
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	100	55	65	71	8	69	43	40	60	86	56	33	55

Table 102.10 - Summary data for BLACKTHORN by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.170. Almost ubiquitous. A deciduous shrub or small tree of open woodlands, scrub, hedgerows, screes and cliff-slopes; a prostrate form also occurs on shingle beaches. 0-500 m (Cross Fell, Cumberland)

Growing requirements

4.171. It grows on a wide variety of soils. It reproduces by seed, and spreads vegetatively by suckers, often forming dense thickets.

Features

4.172. Blackthorn is a much used hedging shrub, partly because of its thorns and also because of its fruit harvest. In many areas, native populations have been augmented by deliberate planting in hedgerows and copses.

4.173. Is spreads readily from seed and is dispersed by birds (avochorous), but also suckers out from established plants. This can lead to a significant widening of some hedgerows if this growth is unchecked, and also gives this species the capacity to fill gaps effectively as it does not rely on seed establishment alone to take advantage of such opportunities.

4.174. The suckering nature of this species means that it is often difficult to detect a single line of trunks indicating actual planting. More often the stems arise as a spread across the width of the hedge indicating that the species is more likely to be there as a result of seeding and suckering.

Species + Position [SP]

[SP][L]

4.175. See [A6-24] and [A1-105]-[A1-124].

4.176. This is generally a ubiquitous species with few hedgerows where it is completely absent like at [A1-122] (see Figure 104.42).

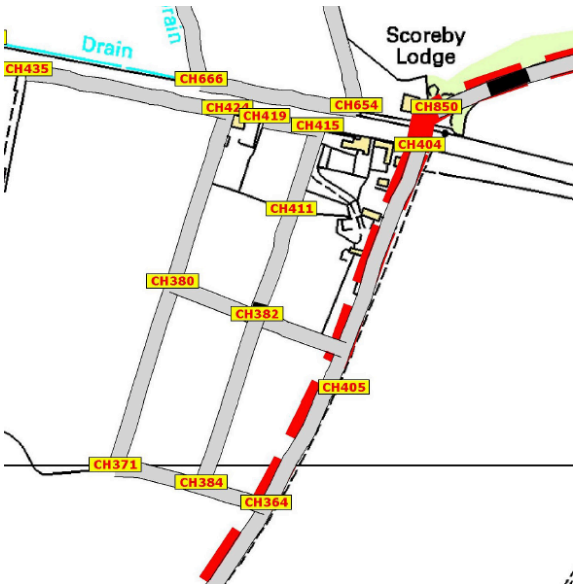

Figure 104.42 – An area of Dunnington Common on the boundary with Kexby where Blackthorn is absent from hedgerows [A1-122].

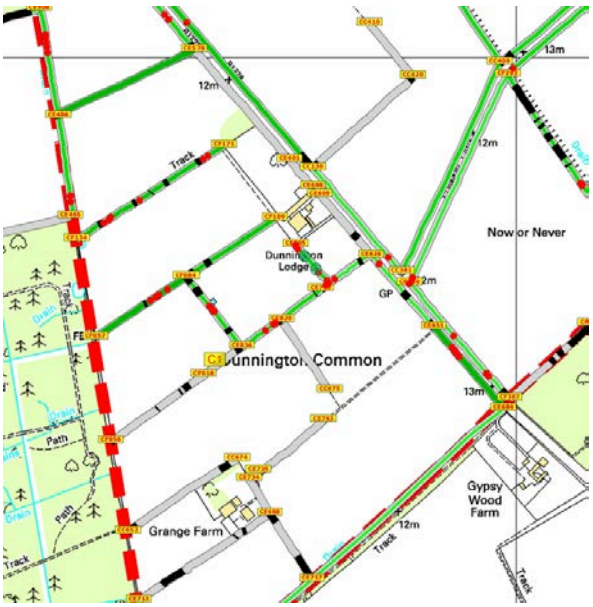

Figure 104.43 – Part of Dunnington Common in Phase [DU-7] showing the wide variation in presence and Abundance of Blackthorn [A1-111].

Species + Position + Abundance [SPA]

[SPA][L]

4.177. The frequency at the landscape level indicated this to be a popular species from all phases and in all parts.

4.178. Blackthorn is often a species that is planted and encouraged along with the more common Hawthorn. It forms a good stock-proof fence and has the added advantage of producing sloes for culinary use.

4.179. As Blackthorn is generally such a frequent species, the absence of Blackthorn within a hedgerow may provide more information than its presence elsewhere.

4.180. With a few minor absences, Blackthorn is generally a ubiquitous species within the landscape (see Figure 202.84).

[SPA][H]

4.181. At the hedge level it was very variable in its occurrence. On occasions it was infrequent enough to individually waypoint and on others it was sufficiently dominant to equal or exceed the abundance of Hawthorn in the hedgerow. It is generally regarded as a relatively aggressive species in hedgerows. It has a great propensity to regenerate and spread by seeding and

suckering. The abundance data for Blackthorn is in the table at Table 102.10.

4.182. This table shows that there are a range of abundances for the species. A high proportion of its occurrence is at relatively infrequent levels. But also it occurs a large number of times at Frequent or Abundant.

4.183. Within the group of hedges planted during the 1709 enclosure [DU-6] this species was found in 67% of hedges and within the group of 1772 enclosures [DU-7] it was in 44% of hedges. This implies either that this species was not encouraged in the later enclosure, or that it has had longer to expand its range in the 1709 enclosures because they were planted 63 years earlier.

Damson - *Prunus domestica* ssp. *insititia*

DAMSON/BULLACE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			4		2	2	15						23
RO													
RF													
RA	1												1
RD													
No RARE	1		4		2	2	15						24
% RARE	50		100		100	50	68						71
OO	1					2	3						6
OF													
OA													
OD													
No OCC	1					2	3						6
% OCC	50					50	14						18
FF							4						4
FA													
FD													
No FREQ							4						4
% FREQ							18						12
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No	2		4		2	4	22						34
TOT HGS	13		51		13	86	155						430
% TOTAL	15		8		15	5	14						8

Table 106.11 - Summary data for DAMSON by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.184. This species has been grown in gardens since at least 995 and known from the wild since 1777. Three subspecies, subsp. *domestica* (plum), subsp. *insititia* (Damson/ Bullace) and subsp. *italica* (greengage) are often recognised. Many plants are relics of cultivation, but subsp. *domestica* is still being introduced from discarded plum stones. Although its overall range is similar to that in the 1962 *Atlas*, it is much better recorded. Relatively absent in Scotland.

Growing requirements

4.185. No specific requirements

Features

4.186. This species may be under-recorded, as confirming its identity normally requires fruits to be present. There is also the possibility that there may be hybrids between Blackthorn and Damson.

Species + Position [SP]

[SP][L]

4.187. See [A6-23] and [A1-148]-[A1-162].

4.188. This species wasn't recorded from many hedgerows. It was absent from Grimston. There was a good number of records for the area of landscape enclosed in 1772 [DU-7] being found in 22 hedgerows in that Phase (see [A1-148]-[A1-162]).

Species + Abundance [SA]

[SA][L]

4.189. It was normally at low frequency in the landscape.

[SA][H]

4.190. AT the hedgerow level it was Frequent in 4 hedgerows in [DU-7] (see [A1-156][BX352-CH788], [CH225-CH230], [CH489-CH504] and [CH504-CH512] and Figure 107.44 and Figure 107.45).

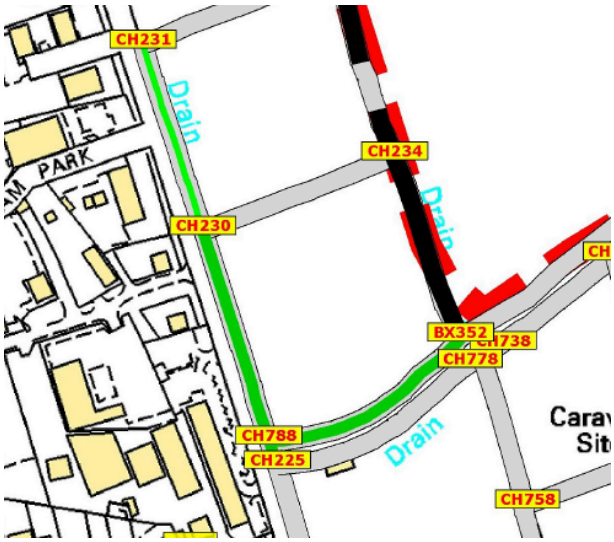

Figure 107.44 – Hedgerows with Frequent Damson on [A1-156][BX352-CH788] and [CH504-CH512].

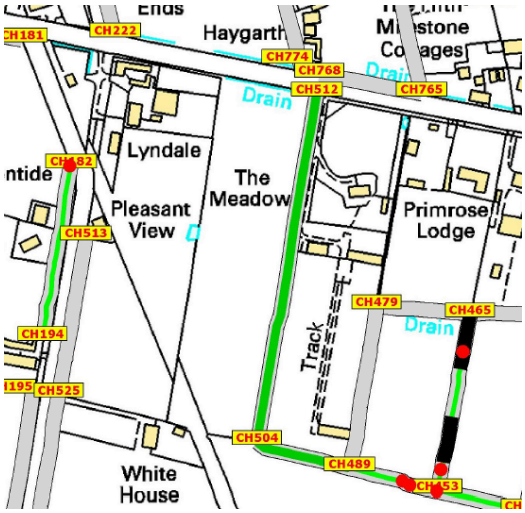

Figure 107.45 – Hedgerows with Frequent Damson on [A1-156][CH225-CH230] and [CH489-CH504].

Species + Position + Abundance [SPA]

[SPA][L]

4.191. These data shows no particular pattern at the landscape level. There are a good number of records on some of the older boundaries (see [A1-153], [A1-154], [A1-156], [A1-157], [A1-158]) indicating it may have been encouraged from historic times.

Bramble - *Rubus fruticosus agg.*

BRAMBLE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	2	9	12	2	2	24	33	2		2	6	1	95
RO		1											1
RF													
RA													
RD				1									1
No RARE	2	10	12	3	2	24	33	2		2	6	1	97
% RARE	18	32	32	27	25	41	30	33		40	30	100	32
OO	8	14	15	4	2	20	51	2	2	3	9		130
OF		1					1						2
OA													
OD			1										1
No OCC	8	15	16	4	2	20	52	2	2	3	9		133
% OCC	73	48	42	36	25	34	47	33	100	60	45		44
FF	1	5	9	3	4	9	23	2			5		61
FA													
FD													
No FREQ	1	5	9	3	4	9	23	2			5		61
% FREQ	9	16	24	27	50	16	21	33			25		20
AA		1	1	1		5	2						10
AD													
No ABUN		1	1	1		5	2						10
% ABUN		3	3	9		9	2						3
No DOM													
% DOM													
TOTAL No	11	31	38	11	8	58	110	6	2	5	20	1	301
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	85	66	75	79	62	67	71	60	40	71	80	33	70

Table 109.12 - Summary data for BRAMBLE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.192. Ubiquitous. 0-490 m (Harwood, Co. Durham).

Growing requirements

4.193. Deciduous or semi-evergreen shrubs of woods, scrub, banks, hedges, heaths and waste places. They can form dominant stands and although they have a very wide ecological tolerance they reach maximum vigour and diversity on acidic soils. They spread by bird-dispersed seeds, and by tip-rooting stems.

Features

4.194. Being easily dispersed by birds, mammals and man this species is virtually ubiquitous across the survey area.

Species + Position [SP]

[SP][L]

4.195. See [A6-33] and [A1-125]-[A1-144].

4.196. There are few hedgerows across the study area where Bramble is absent.

Species + Abundance [SA]

[SA][L]

4.197. The frequency of Bramble at the landscape level [SA][L] shows that it was found in 301 of the 430 hedgerows surveyed or 70%.

[SA][H]

4.198. At the hedgerow level [SA][H] it never dominated, but was Frequent on 61 hedgerows and Occasional on 133. It was sometimes Dominant in gaps where it appeared to be the early colonising species following the demise of the woody species due to age or fire etc.

Species + Position + Abundance [SPA]

[SPA][L]

4.199. Bramble is generally a ubiquitous species although it does have notable absences along certain hedgerows. Although it is unlikely to have been actively encouraged, it is likely to have been tolerated in the past because of its culinary use and it is also a good plant for creating a stock-proof barrier.

[SPA][H]

4.200. It often achieves Abundant where it colonised these naturally formed gaps in hedgerows. This may be due in part to the fact that where hedgerows have gaps, the hedging plants at either side tend to be able to flower and set seed and encourage birds to land and feed. As a consequence the birds are likely to deposit the seed of Bramble into the edges of these gaps. In some cases bramble is actually Dominant in such gaps. This has an added advantage in that it will offer protection to other shrubs and trees that can germinate under its protection

and grow up and eventually outcompete the Bramble and re-colonise the gap.

Dogwood - *Cornus sanguinea*

DOGWOOD													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	3	3	2	1		6							15
RO		1											1
RF													
RA													
RD													
No RARE	3	4	2	1		6							16
% RARE	50	80	40	50		55							55
OO	2	1	1			2							6
OF													
OA													
OD	1												1
No OCC	3	1	1			2							7
% OCC	50	20	20			18							24
FF			1	1		2							4
FA													
FD						1							1
No FREQ			1	1		3							5
% FREQ			20	50		27							17
AA													
AD			1										1
No ABUN			1										1
% ABUN			20										3
No DOM													
% DOM													
TOTAL No	6	5	5	2		11							29
TOT HGS	13	47	51	14		86							430
% TOTAL	46	11	10	14		13							7

Table 111.13 - Summary data for DOGWOOD by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.201. A species with a distribution that extends to Northumberland along the eastern side of the country, but only realistically up to Cheshire in the west (see Figure 112.46)

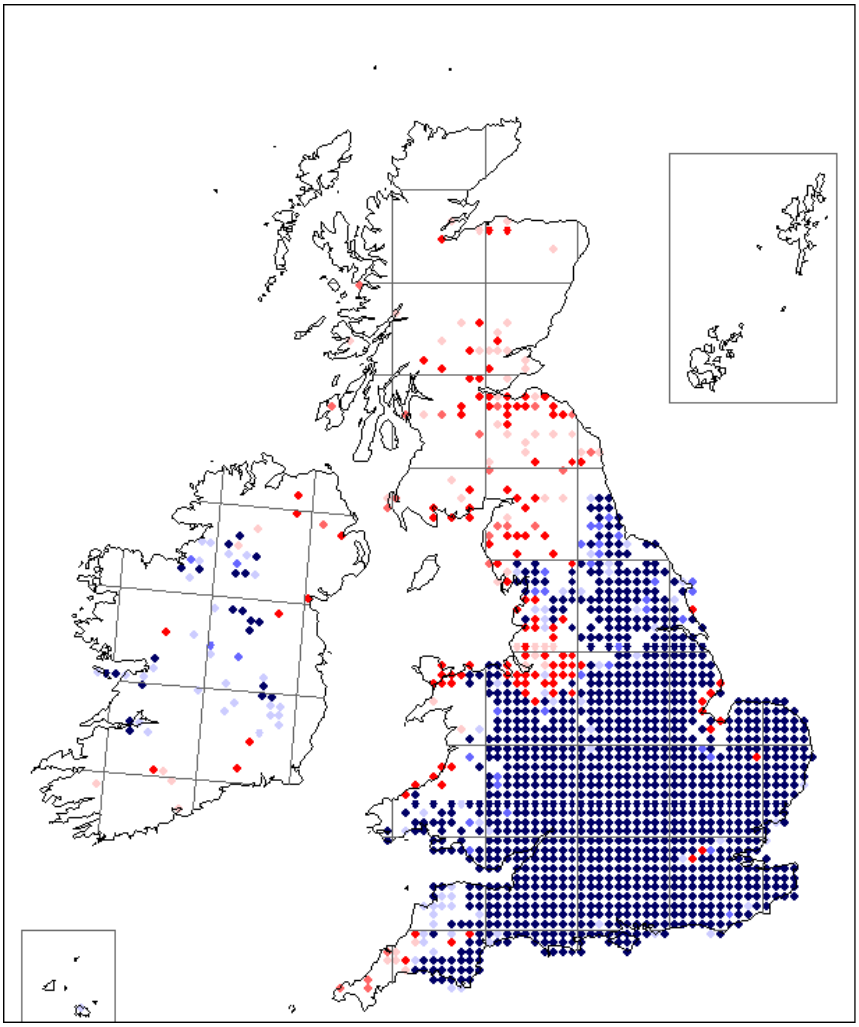

Figure 112.46 - National distribution of Dogwood *Cornus sanguinea*

Growing requirements

4.202. A deciduous shrub, locally frequent in woodland, scrub, hedgerows and shelter-belts on limestone soils or base-rich clays, and sometimes dominant in hedges and scrub on chalk.

Features

4.203. It is frequently planted in landscaping schemes and is introduced sporadically, or occurs as an escape, outside its native range. Lowland.

4.204. It is bird dispersed and can therefore potentially colonise new hedgerows. It also has the habit of creating suckering thickets and can occupy stretches of hedgerow at high abundance, often super-abundant.

Species + Position [SP]

[SP][L]

4.205. See [A6-9] and [A1-163]-[A1-172]

4.206. At the landscape level [SP][L] it is completely absent from Grimston and also from [DU-7].

[T][SP][L]

4.207. It clearly has an association with the older hedgerows even taking into account the relatively low number of records.

4.208. There is an association with ancient boundaries as it occurs at several places along the northern township boundary of Dunnington [A1-167] and [A1-170]. It is also on the internal open field boundary hedgerows of Dunnington Lane [A1-166], Intake Lane [A1-169] and Eastfield Lane [A1-170], and on the township boundaries between Dunnington and *Scoreby* at [A1-171] and between Dunnington and *Stamford Bridge West* [A1-172].

4.209. The remaining records largely follow the 'grain' and support other species as historic markers in combination, especially across Mill Field and East Field, but also across Undergate Field and Thorntree Field. It showed a tendency to occur more frequently in hedgerows east of Dunnington (see [A1-170]).

4.210. Dogwood also supports English Elm at [A1-163][BX146-BX155] and [BS869-BX180] as a combination of historic markers.

Species + Abundance [SA]

[SA][L]

4.211. At the landscape level [SA][L] this species is a relatively frequent component of [DU-1] to [DU-4]. For [DU-1] it was found in 6 out of the 13 hedgerows or 46%.

4.212. This species was only recorded in 29 hedges representing 7% of those surveyed. Within this group of 29 it was most frequently recorded as a Rare component at 16 (55% of 29) and was only recorded as Abundant on one occasion.

[SA][H]

4.213. At the hedgerow level it was generally Rare to Frequent, with only one record where it was judged to be Abundant.

Species + Position + Abundance [SPA]

[T][SPA][L]

4.214. The chart at Figure 114.47 shows the bias towards the earlier phase hedgerows in Dunnington and an absence from Grimston.

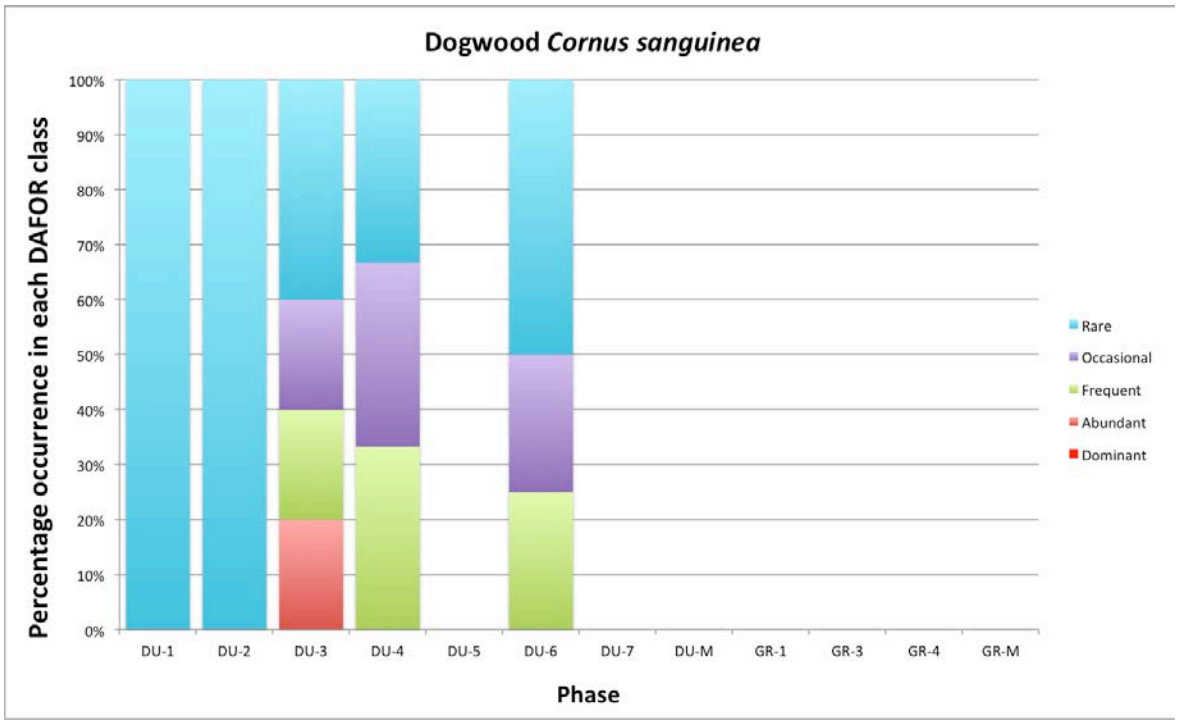

Figure 114.47 - Chart of the percentage frequency in each DAFOR class in each phase for Dogwood *Cornus sanguinea* - [T][SPA][L]

4.215. Although, it is also frequently planted into new hedgerows and as a component of hedges that are gapped-up.

4.216. Dogwood appears to have a relatively weak species-location preference for township boundaries and medieval hedgerows [T][SPA][L]. It does have an association with the older phases of development although it curiously appears frequently in [DU-6]. Because this species is dispersed by berries carried by birds, it is likely that some of the records relate to this method of spread across the landscape.

Elder - *Sambucus nigra*

ELDER													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	6	15	19	4	3	23	29	4	2	2	10	2	120
RO													
RF													
RA													
RD													
No RARE	6	15	19	4	3	23	29	4	2	2	10	2	120
% RARE	50	47	58	80	100	46	44	80	67	50	77	100	52
OO	4	10	7			11	21			2	2		57
OF		2	2										4
OA													
OD													
No OCC	4	12	9			11	21			2	2		61
% OCC	33	38	27			22	32			50	15		27
FF	2	5	5	1		10	13	1	1		1		39
FA							1						1
FD													
No FREQ	2	5	5	1		10	14	1	1		1		40
% FREQ	17	16	15	20		20	21	20	33		8		17
AA						5	2						7
AD						1							1
No ABUN						6	2						8
% ABUN						12	3						3
No DOM													
% DOM													
TOTAL No	12	32	33	5	3	50	66	5	3	4	13	2	229
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	92	68	65	36	23	58	43	50	60	57	52	67	53

Table 115.14 - Summary data for ELDER by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.217.

Growing requirements

4.218. No specific growing requirements

Features

4.219. Regarded as a weed species of hedgerows this species is often actively removed from hedgerows where it establishes. There is some evidence from observation that Elder colonises gaps readily. There are many cases where a gap has Elder at both ends. This would indicate potential bird dispersal where birds perch on the shrubs next to gaps and the seeds can

establish in the gap with the lack of competition (see also Bramble). In some cases where there are very gappy and poorly maintained hedgerows there are abundant Elder plants.

4.220. Historically farmers were encouraged, or chose, to remove Elder where possible. In Yorkshire it was referred to as Bour-tree bush (in Dunnington there is Bore Tree Baulk on [A2-5] north of Grimston Hill). In folklore it had connotations with witchcraft and other unsavoury activities. It can be an aggressive species and it has a tendency to grow unrestricted where it occurs within hedgerows. If the hedgerow is not cut frequently this leads to a 'lumpy' appearance to the hedgerow where the actively growing Elder bushes are located. The same lumpy appearance is created by other 'active' species like Ash and Wych Elm.

Species + Position [SP]

[SP][L]

4.221. See [A6-38] and [A1-173]-[A1-192].

4.222. Occurs almost everywhere across the landscape.

Species + Abundance [SA]

[SA][L]

4.223. It is Frequent across the whole survey area [SA][L]. In most Phases it is Rare to Frequent. In [DU-6] and [DU-7] there are 6 and 2 hedgerows where the species was recorded as Abundant [SA][H].

Species + Position + Abundance [SPA]

[SPA][L]

4.224. There does not seem to be any pattern of [SPA][L] in this species as it seems to be positioned ubiquitously and randomly across the landscape and has no systematic pattern of abundance where it occurs.

ELMS

English Elm - *Ulmus procera*

ENGLISH ELM													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		2	4			6	6				1		19
RO													
RF													
RA													
RD				1									1
No RARE		2	4	1		6	6				1		20
% RARE		17	44	33		60	35				100		36
OO		4		1		1	2		1				9
OF													
OA													
OD				1			1						2
No OCC		4		1		1	3		1				11
% OCC		33		67		10	18		100				20
FF		1				1	2						4
FA													
FD							1						1
No FREQ		1				1	3						5
% FREQ		8				10	18						9
AA		1	1			1	1						4
AD		1	4		1	1	2						9
No ABUN		2	5		1	2	3						13
% ABUN		17	56		50	20	18						23
No DOM		3			1		2					1	7
% DOM		25			50		12					100	13
TOTAL No		12	9	3	2	10	17		1		1	1	56
TOT HGS		47	51	14	13	86	155		5		25	3	430
% TOTAL		26	18	21	15	12	11		20		4	33	13

Table 117.15 - Summary data for ENGLISH ELM by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.225. Generally southern and regarded as introduced further north (see Figure 118.48).

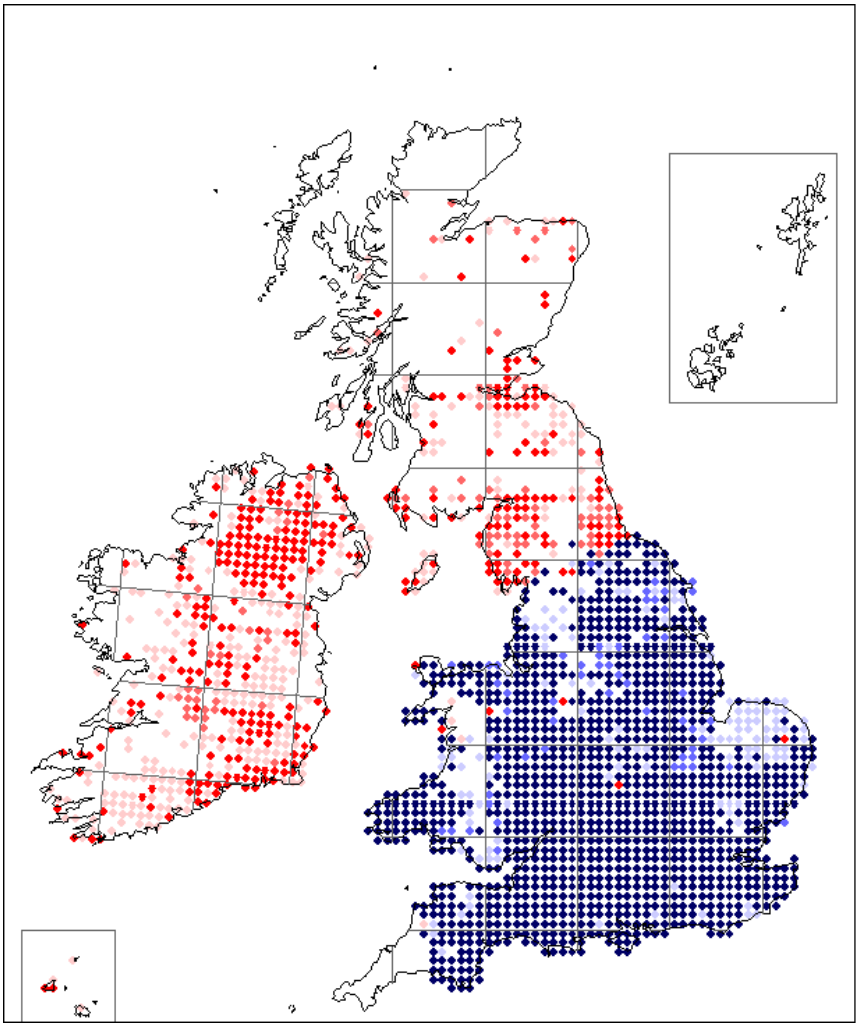

Figure 118.48 - National distribution of English Elm *Ulmus procera*

Growing requirements

4.226. It prefers the deep and moist soils of major river systems. Lowland.

Features

4.227. In most areas few mature trees remain, being very susceptible to the current outbreak of Dutch Elm disease which began *c.* 1965. New sapling growth still succumbs, but the species remains a major hedgerow constituent, particularly in its core area. The natural distribution is much confused by planting, but probably does not extend much beyond England and Wales. Hybrids with other *Ulmus* taxa are infrequent.

4.228. English Elm**,** as already mentioned, appears to be a significant species in the historic hedged landscape of the Dunnington area. The indications from the work done at

Scoreby suggest that this was a preferred species planted or encouraged in the medieval period as it is strongly associated with a field pattern indicative of that Phase in *Scoreby*, or possibly earlier.

4.229. English Elm is a species that does not set seed in this country and relies on suckering to spread. This also means that not only has this species persisted from early time, but also the plants there today are the same plants that were there when the hedgerows were formed. A suckering habit effectively makes English Elm immortal as it constantly renews itself by advancing and suckering.

4.230. In a hedgerow English Elm is likely to persist even if the recently introduced Dutch Elm disease is present as the disease only attacks plants once there is a trunk diameter of approximately 15cm. In a hedgerow, stems of English Elm are rarely so large. And even if the disease should affect the plant, the suckering nature is likely to allow new growth to escape and continue the spread of the species.

Species + Position [SP]

[T][SP][L]

4.231. See [A6-45] and [A1-193]-[A1-206].

Township boundaries

4.232. Looking at the pattern of distribution across Dunnington and Grimston medieval townships there are clear indications that this species is associated with some of the more ancient boundaries and routeways within that landscape. [T][SP][L] It is preferential for Township boundaries and the roads that separated the internal medieval fields. It also has [T][SPA][H] attributes as it has differences in abundance when found. On some hedgerows it is super-abundant and on others it may only be as single plants.

4.233. The northern boundary of Dunnington is a good example of English Elm on a Township boundary (Dunnington phase 2). Several hedgerows along the southern side of this road have English Elm present (see [A1-194], [A1-195], [A1-198], [A1-199], [A1-20], [A1-204] and Figure 121.49).

4.234. This species is also along the Dunnington/ Kexby boundary (Dunnington phase 2) as seen on [A1-205] and [A1-206].

4.235. And on the Dunnington/ Grimston boundary (Grimston phase 1) [A1-193] [A1-194] [A1-196] on the Grimston side of

the Elvington Lane (except on [A1-197] where it is also on the hedgerow that passes east of Derwent Nurseries). This alignment parallels what could be fragments of a coaxial field system to the east and west. To the west is hedgerow [A1-193][CE145-CE174] and to the east is hedgerow [A1-197][BX060-BX073]. Supporting evidence comes from the presence of Guelder-rose on [A1-247][CE099-CE117], and Spindle on [A1-411][BX092-BX117].

4.236. Also on the Dunnington/ *Scoreby* boundary at [A1-203][BH210-BL2026].

Open field boundaries

4.237. It also occurs in good quantity on some of the Dunnington phase 3 - between open field hedgerows – such as along Dunnington Lane leading from York to the village (see [A-199] and Figure 121.50). It occurs of both sides of the lane which Stephen Moorhouse regards as a lane separating two medieval open fields, Thorntree field and Undergate field.

4.238. This alignment also leads through the village to be picked up on Peter Croft's Lane at [A1-203] that separates East Field from the area of croft and tofts east of the medieval core of Dunnington.

4.239. It also occurs on the hedgerows both sides of Intake Lane and borders East Field again at [A1-203] where it is super-abundant (phase 3). It is at both the western and eastern ends on the southern boundary at [A1-203][BL2046-BX286] and [A1-203][BL2027-BL2032]-[BL2026-BL2027] respectively. These are presumed by Stephen Moorhouse to be phase 4. The speculation would be that both hedgerows along Intake lane were either contemporary with phase 3 or pre-dated phase 3 and were part of a pre-medieval routeway and they have been extensively re-planted leaving the fragments at both ends on both sides.

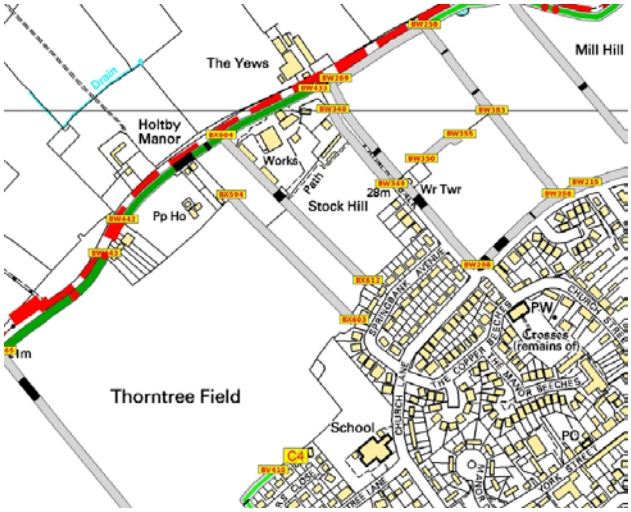

Figure 121.49 – A section of the northern boundary of Dunnington showing the incidence of English Elm in the hedgerows.

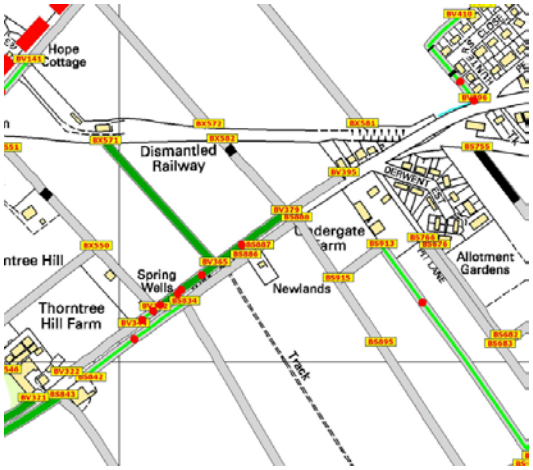

Figure 121.50 – English Elm on both sides of Dunnington Lane and also on what was possibly a pre-medieval NW-SE alignment.

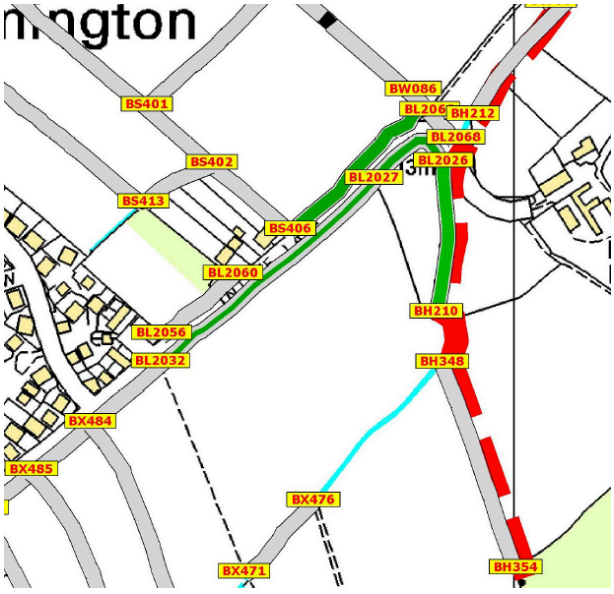

Figure 121.51 – The northern end of Intake Lane that was double-hedged with English Elm that has been retained historically while the rest of the Lane was re-planted more recently.

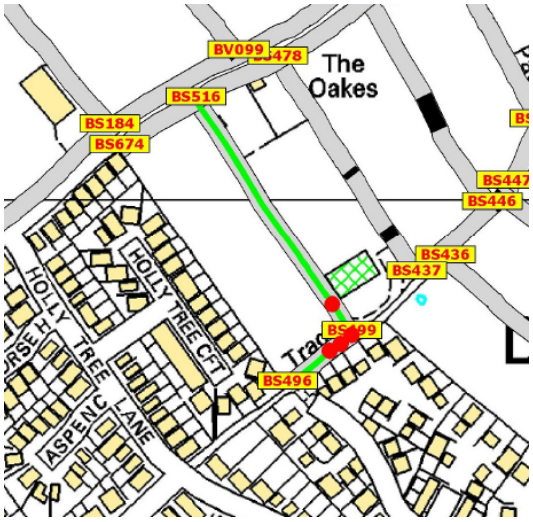

Figure 121.52 – English Elm along the north side of Peter Croft Lane and also on [BS499-BS516], but only at the southern end where it has colonised along from Peter Croft Lane.

Roads, Lanes and tracks.

4.240. In addition to Elvington Lane, Dunnington Lane, Peter Croft Lane, the A166 and Intake Lane having English Elm

hedgerows, the main road to Hull, the A1079, also had English Elm on both sides at various points within the study area.

Former road alignment?

4.241. Another curious occurrence of English Elm is on what could potentially be a re-alignment of the A1079 as shown on Figure 131.58 where hedgerow [A1-202][CH176-CH198] retains two plants of English Elm (see Figure 122.53).

4.242. However, this may be part of a coaxial field system as there are a number of other hedgerows to the south that have the same 'grain' running NW-SE at a more E-W bearing than the coaxials that cross the Dunnington moraine that are on a more N-S bearing.

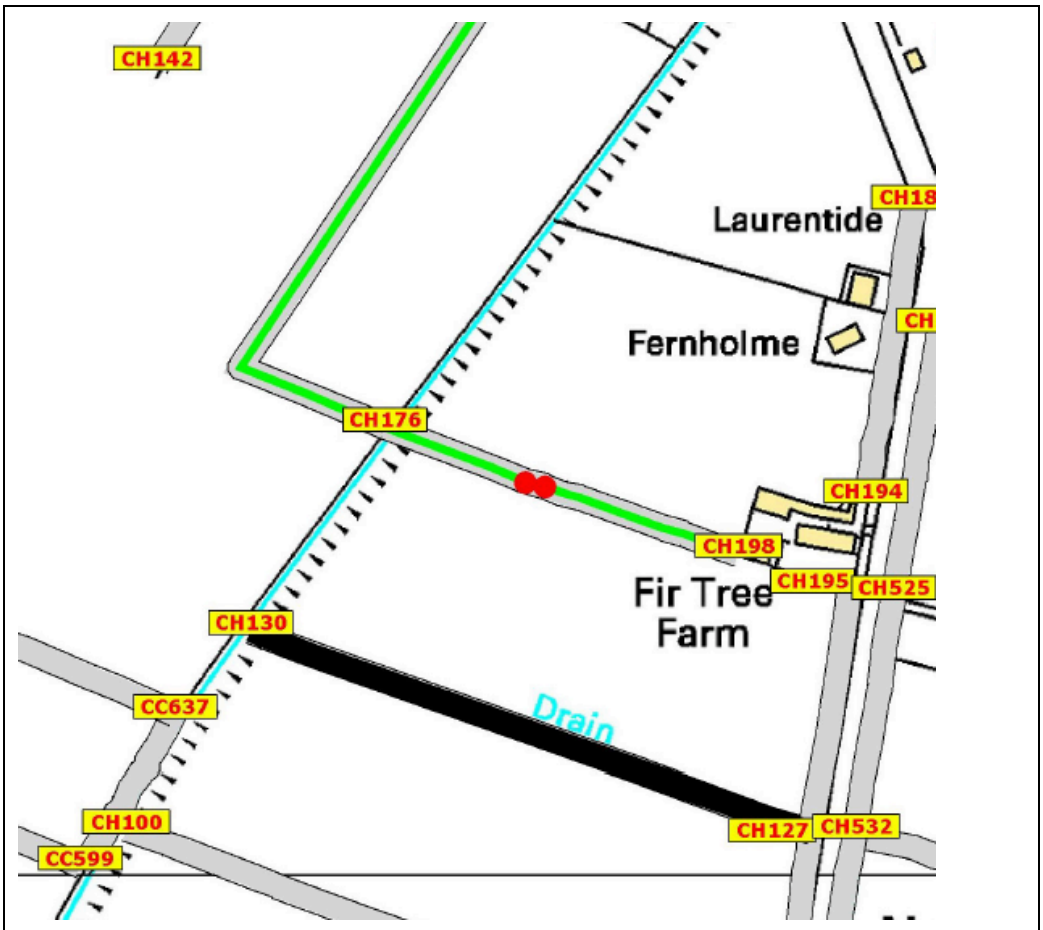

Figure 122.53 – The presence of English Elm on what is speculated could be an earlier alignment of the A1079 [A1-202].

Coaxial alignments

4.243. See 4.235 above. These may be linked to the following.

4.244. The anomalous [T][SPA][L] occurrences are a number of hedgerows where there is Abundant to Dominant English Elm

on hedgerows that have an alignment that goes over the moraine at right-angles i.e., NW-SE. Examples are near Dunnington on Dunnington Lane [A1-199][BV365-BX571], and [A1-199][BS755-BS760] and running north and south of the lane (see Figure 124.54 and Figure 124.55), and also at [A1-195][BV486-BX521].

4.245. The latter ([BS755-BS760]) was investigated further as the 1st ed. OS map shows a hedgerow running NW to meet up with Vengeance Lane across the A166 (see [A5-11] and [A1-199]). There is the possibility that [BS755-BS760] was the eastern hedgerow of a lane that continued with a now missing hedgerow across Thornhill Field forming the western hedgerow at that point (see Figure 131.58). This hedgerow appears to have crossed the A166, as a single extant English Elm bush is found where the blue circle is on [A1-199]. In the area of this crossing there were some plants of English Elm on the southern side of the A166. But the road curves at this point and the English Elm at the start of Vengeance Lane is north of what would have been the northern side hedgerow of the A166, making it more likely that the English Elm on Vengeance Lane was not part of the A166 northern side hedgerow.

4.246. Unfortunately the Vengeance Lane hedgerow is severely degraded and no more English Elm occurs north of the location on the A166 junction. The presence of English Elm part way along hedgerow [A1-199][BV396-BV410] suggests another parallel coaxial hedgerow. Precisely aligning the gaps in these hedgerows is difficult and there is no certainty as to which joined with Vengeance Lane and which side of a possible track they were. All we can see is a number of parallel hedgerows south of Thorntree Field and a probable link to Vengeance Lane north of the A166.

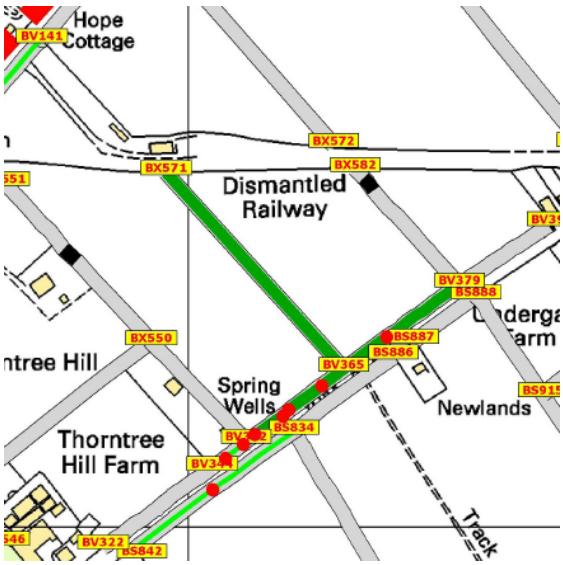

Figure 124.54 – An English Elm dominated hedgerow running northwest from Dunnington Lane [C4][BV365-BX571] on [A1-199].

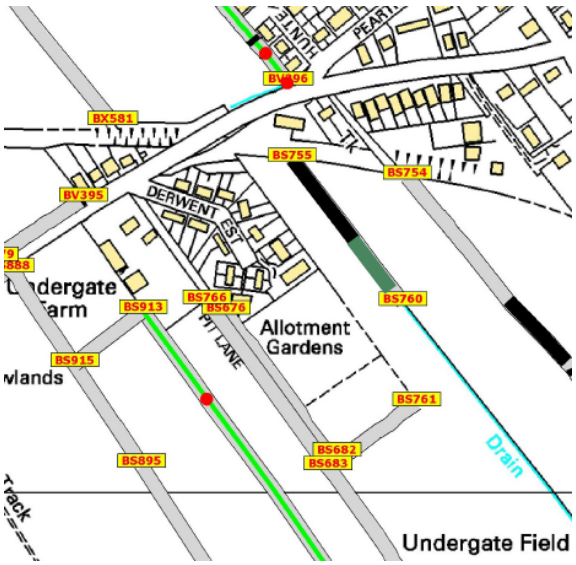

Figure 124.55 – Several NW-SE aligned hedgerows with English Elm. [C4][BS755-BS760] was dominated by the species (see [A1-199]).

4.247. Another set of potential coaxials is on The Intakes as identified by Stephen Moorhouse. Hedgerows relating to this phase are in orange on [A5-1]and comprise the block of land shown on Figure 125.56.

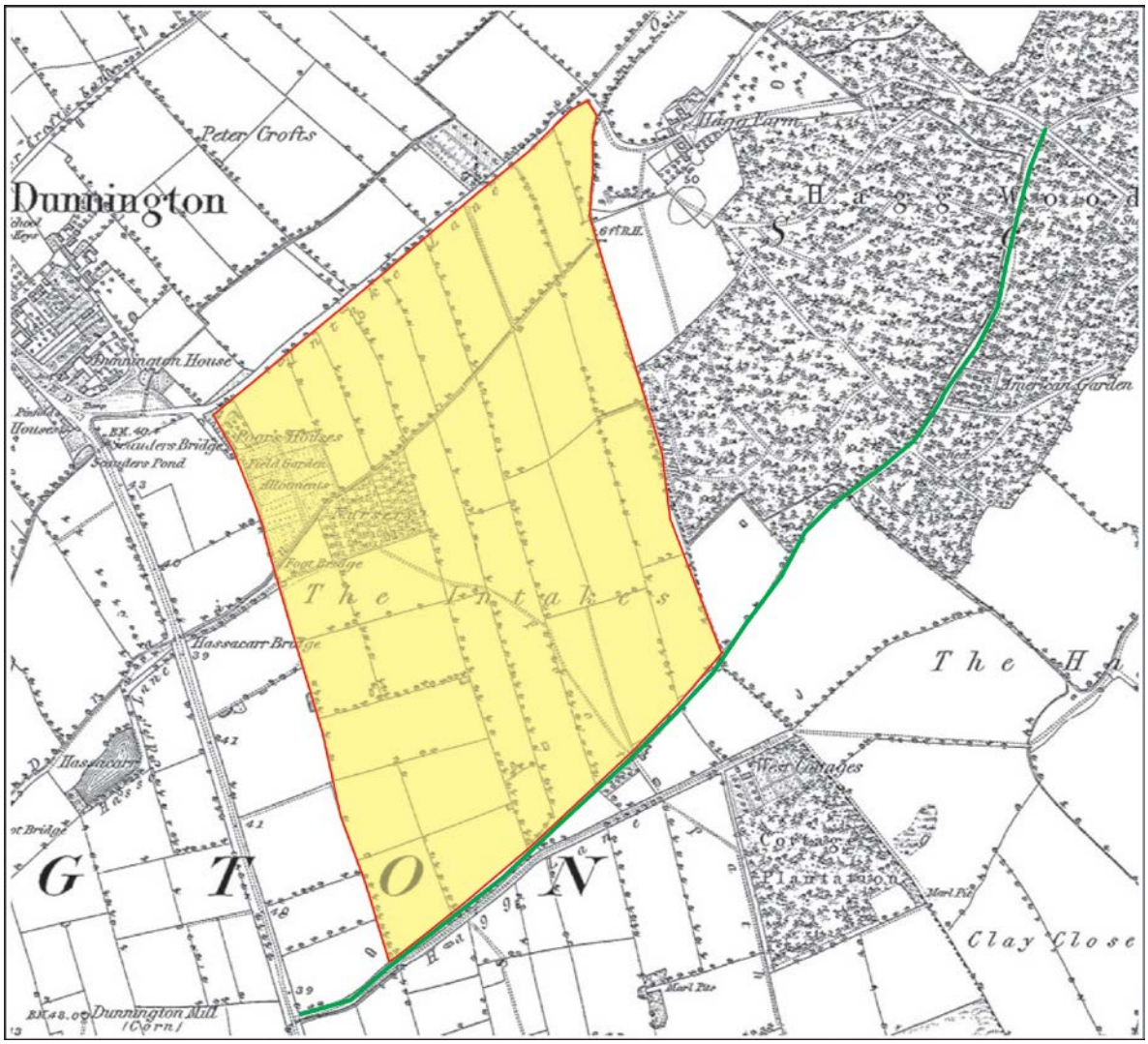

Figure 125.56 – The area of land believed to have been surrounded by hedgerows as part of Dunnington phase 4 in the late 17c. The internal hedgerows were then placed in the 1709 enclosure.

4.248. There is a curious cluster of hedgerows in the eastern part of Dunnington township split between the Dunnington Intakes and the northern part of Dunnington Common. English Elm picks out [A1-202][BX315-BX361] north of Hagg Lane, but it also seems to flag up [CH774-CH778], [CH746-CH755-CH734-CH762-CH765] and [A1-206][CH629-CH666] with septum hedgerows at [A1-202][BX322-BX337] and [A1-202][CH728-CH734]. Were these part of an earlier field system that phase 4 and phase 6 retained when they were enclosed and hedged? See Figure 126.57.

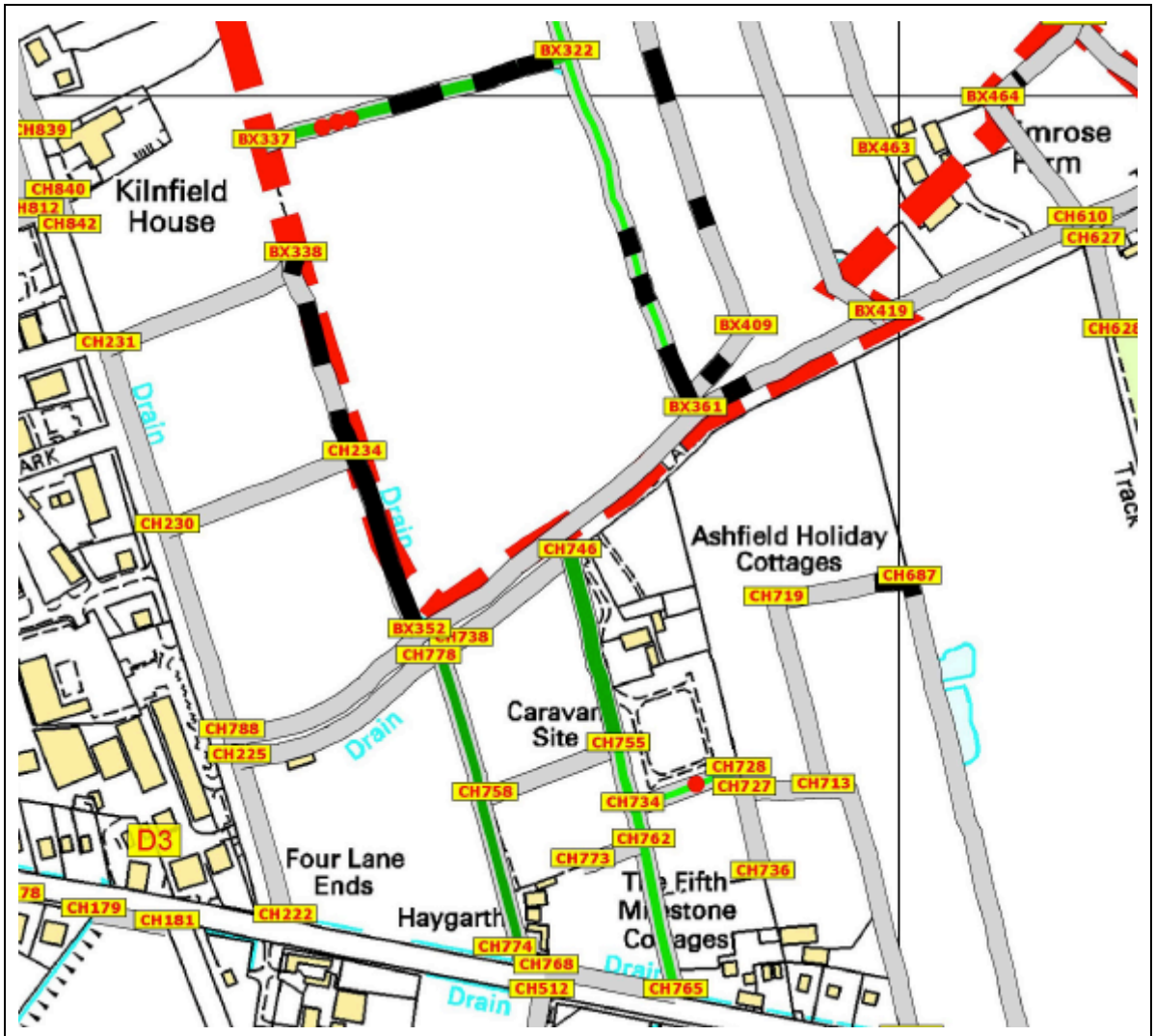

Figure 126.57 – The 'grain' and cross-septum hedgerows in, and to the south, of The Intakes either side of Hagg Lane.

[T][SP][H]

4.249. There are a number of places in the landscape where evidence suggests that English Elm is colonising along relatively recently formed hedgerows from an initial inoculant originating in an historic hedgerow containing the species. Two good examples are at [A1-199][BV396-BV410] north of Dunnington Lane where the species is recorded, but only towards the lane and at Peter Croft Lane on [A1-203][BS499-BS516] where it may have only progressed a short distance from the lane. This hedgerow is suggested by Stephen Moorhouse to be phase 6 (1709). This is likely as the alignment would not suggest it is part of an earlier coaxial system as might be the case for some

of the hedgerows running NW-SE across the moraine through East Field.

Species + Abundance [SA]

[SA][L]

4.250. At the landscape level this species is generally Rare.

[SA][H]

4.251. The abundance data for this species differs from the norm of a tendency to be towards the Rare end of the spectrum. There were 7 hedgerows where it was Dominant and 13 where it was Abundant. This accords with the data from *Scoreby* where three hedgerows datable to the medieval period are all now dominated by English Elm. Either this species was planted at this density or the species has aggressively become more dominant naturally over the last 800-100 years. The vegetative suckering of English Elm will give it an advantage over seed dispersed species when gaps open up next to English Elm plants as they will be able to immediately move into the gap supported by the food resources of the main plant.

4.252. At the landscape level it is relatively uncommon, being recorded from 56 out of 430 or 13% of hedgerows in the study area. It is rarer in Grimston (three hedgerows only) than in Dunnington (53 hedgerows).

Species + Position + Abundance [SPA]

[SPA][L]

4.253. The green line and dot for English Elm on the hedgerow end at [A1-199] [BS904-BS913] needs checking as the field sheet shows single plants of both species at that location and waypointed with the same number. Both may be there, but also, it could be only one species, in which case, which one will be important.

4.254. Maps showing the *Scoreby* evidence for English Elm being a medieval or pre-medieval species are shown at Figure 239.95 to Figure 241.97. The first two of these figures show the overview of the landscape and the curved boundaries centred on the manor of *Scoreby*, both 1st ed. OS and modern OS base maps to show the trace of what was there and what is left now. The third shows the presence of English Elm on two of the curved concentric rings and down a 'spoke' between two rings. These were the only three hedgerows where English Elm

was found in *Scoreby* apart from on the medieval Township boundary with Dunnington.

Wych Elm - *Ulmus glabra*

WYCH ELM												
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1	3			6	6						16
RO													
RF													
RA													
RD													
No RARE		1	3			6	6						16
% RARE		50	75			75	100						80
OO		1				2							3
OF													
OA													
OD													
No OCC		1				2							3
% OCC		50				25							15
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD			1										1
No ABUN			1										1
% ABUN			25										5
No DOM													
% DOM													
TOTAL No		2	4			8	6						20
TOT HGS		47	51			86	155						430
% TOTAL		4	8			9	4						5

Table 129.16 - Summary data for WYCH ELM by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.255. Country-wide except for the uplands of Scotland. 0-530m (Atholl, E. Perth).

Growing requirements

4.256. No specific requirements

Features

4.257. This is less frequently recorded than English Elm and has some affinity with historic boundaries.

4.258. It is a largely non-suckering tree of hedges, field-borders and streamsides, but also forms mixed or pure woodland, especially on limestone and other base-rich soils. It is also a

colonist of ungrazed grassland, rocky ground and waste and spoil heaps, and is also planted.

4.259. Wych Elm, by contrast to English Elm, sets seed readily and does not sucker. Hence it could potentially disperse more widely that English Elm over time, being wind dispersed (anemochorous).

4.260. In this survey the two elm species were separated by leaf size and the corky twigs in English Elm. There may have been some doubt over some identifications as some of the positions for Wych Elm are along what are probably ancient boundaries where English Elm would be expected.

Species + Position [SP]

4.261. See [A6-44] and A1-211]-[A1-215].

[T][SP][L]

4.262. Wych Elm from [A6-44] is on some township/medieval field boundaries (see [A1-206], [A1-201], [A1-213], [A1-215]. But also has apparent random locations.

4.263. An intriguing exception might be seen on [A1-209] where it occurs on two NW-SE aligned hedgerows [A1-209][BX092-BX117] to the north and [A1-209][CC410-CC420] to the south. It is speculated that there may have been historic re-alignments of roads that are now detectable as botanical remnants. Three speculative roads are shown on Figure 131.58. The trace of the southern re-alignment is reflected in the locations of the Wych Elm plants as shown on [A1-209][BX092-BX117] and [CC410-CC420]. The [BX092-BX117] alignment is also supported by the presence of Spindle [A1-411], and the middle alignment is supported by the presence of English Elm as discussed above. With the possible doubt over the precise identification it seems likely that 'Elm' is acting as a marker for possible older road alignments.

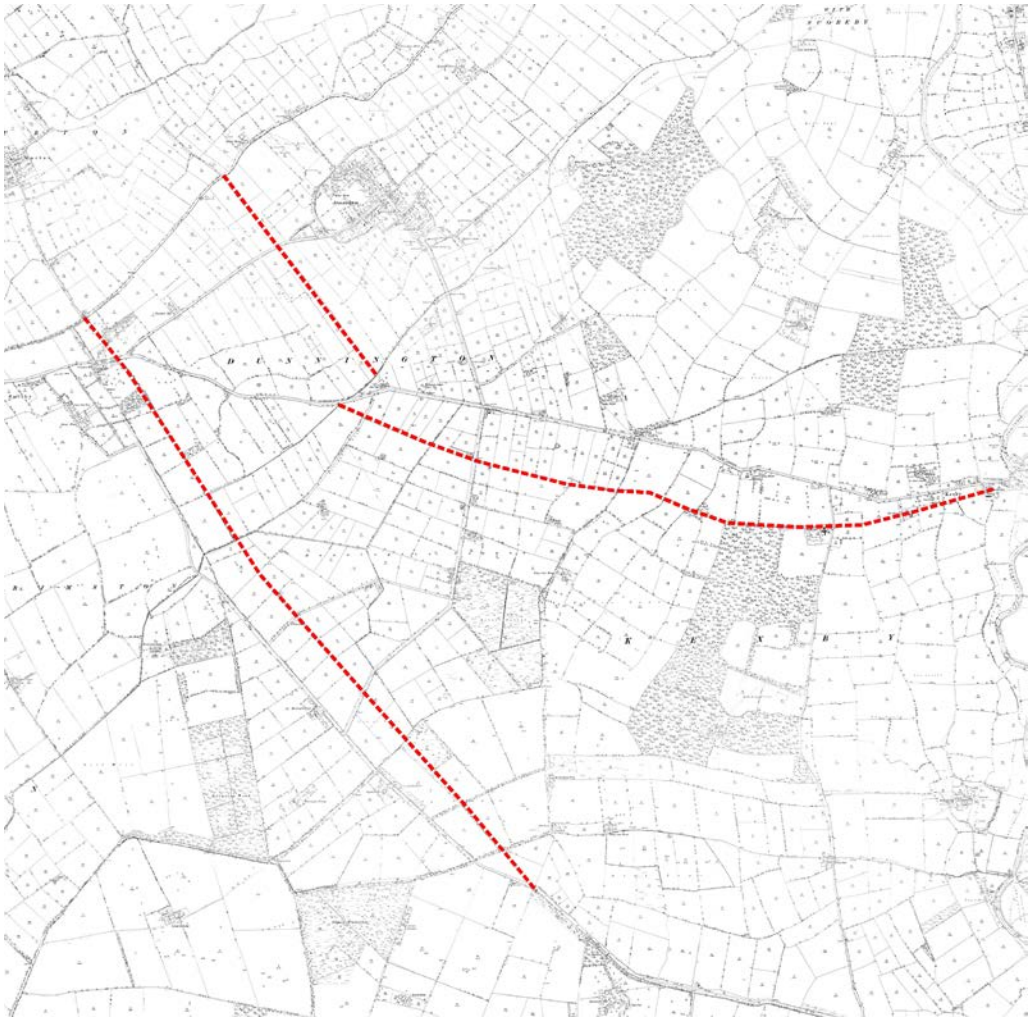

Figure 131.58 – Speculative former road alignments that have supporting hedgerow botanical data corroboration. The northern one contains English Elm as a probable marker. The southern one has Wych Elm and Spindle as markers. And the middle one has English Elm as a marker.

Species + Abundance [SA]

[T][SA][L]

4.264. Wych Elm is more abundant in the [DU-6] and [DU-7] Phases, with only a few records earlier in [DU-2] and [DU-3].

[SA][L]

4.265. Found on 20 out of the 430 hedgerows overall (5%).

[SA][H]

4.266. Normally found as Rare or Occasional along hedgerows. This species does not have the aggressive capacity of English Elm *Ulmus procera* to dominate sections.

Species + Position + Abundance [SPA]

4.267. Wych Elm is normally at lower frequency than English Elm and the Positions where it is found have already been discussed above.

Field Maple - *Acer campestre*

FIELD MAPLE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	5	5	11	3	1	25	9	1			2		62
RO													
RF													
RA				1									1
RD													
No RARE	5	5	11	4	1	25	9	1			2		63
% RARE	63	33	35	67	100	51	69	100			67		49
OO	2	3	8	2		15	1		1				32
OF		2											2
OA													
OD													
No OCC	2	5	8	2		15	1		1				34
% OCC	25	33	26	33		31	8		100				26
FF	1	1	6			8	2						18
FA													
FD			3										3
No FREQ	1	1	9			8	2						21
% FREQ	13	7	29			16	15						16
AA		4	1			1	1			1			8
AD			2										2
No ABUN		4	3			1	1			1			10
% ABUN		27	10			2	8			100			8
No DOM													
% DOM													
TOTAL No	8	15	31	6	1	49	13	1	1	1	3		129
TOT HGS	13	47	51	14	13	86	155	10	5	7	25		430
% TOTAL	62	32	61	43	8	57	8	10	20	14	12		30

Table 133.17 - Summary data for FIELD MAPLE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.268. This species is common as far as the Yorkshire/ Durham area but is mainly introduced in areas further north (see Figure 134.59). 0-380 m (Llanthony, Brecon).

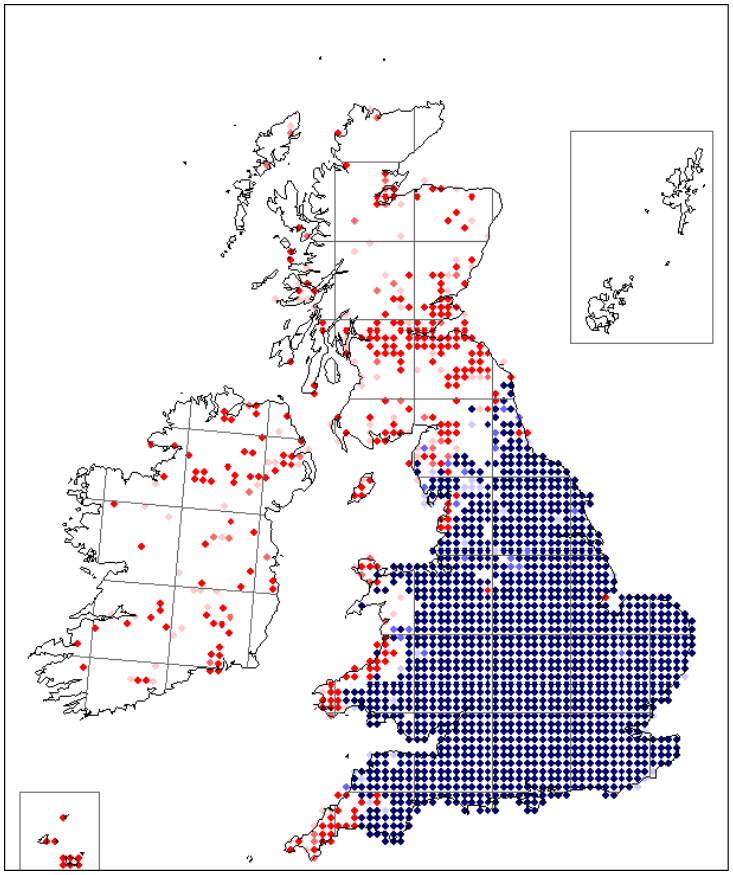

Figure 134.59 - National distribution of Field Maple *Acer campestre*

Growing requirements

4.269. A deciduous tree, native in woodland, scrub and old hedgerows on a wide range of moist, usually base-rich, soils.

Features

4.270. Field Maple is a species that occurs in nearly all Phases and in all townships. It is normally found in the hedge component and rarely as a tree. It is also widespread as a planted tree in amenity areas, on farmland, along roads and in hedgerows and coppices. It fruits erratically, sometimes producing only male flowers following a year of prolific fruiting.

4.271. Although the seeds are wind dispersed they are likely to have limited ranges as discussed for Ash at paragraph 4.140.

Species + Position [SP]

4.272. See [A6-2] and [A1-216]-[A1-235].

[SP][L]

4.273. It is mainly in Dunnington with fewer records on Dunnington Common and very few locations in Grimston. This hints at the species being preferential for older hedgerows.

Species + Abundance [SA]

[T][SA][H]

4.274. In general across the study area it is present at Rare to Frequent, with 10 instances where it was Abundant. It tends to be recorded as Rare in more recent phases and was Abundant in places in [DU-2] and [DU-3].

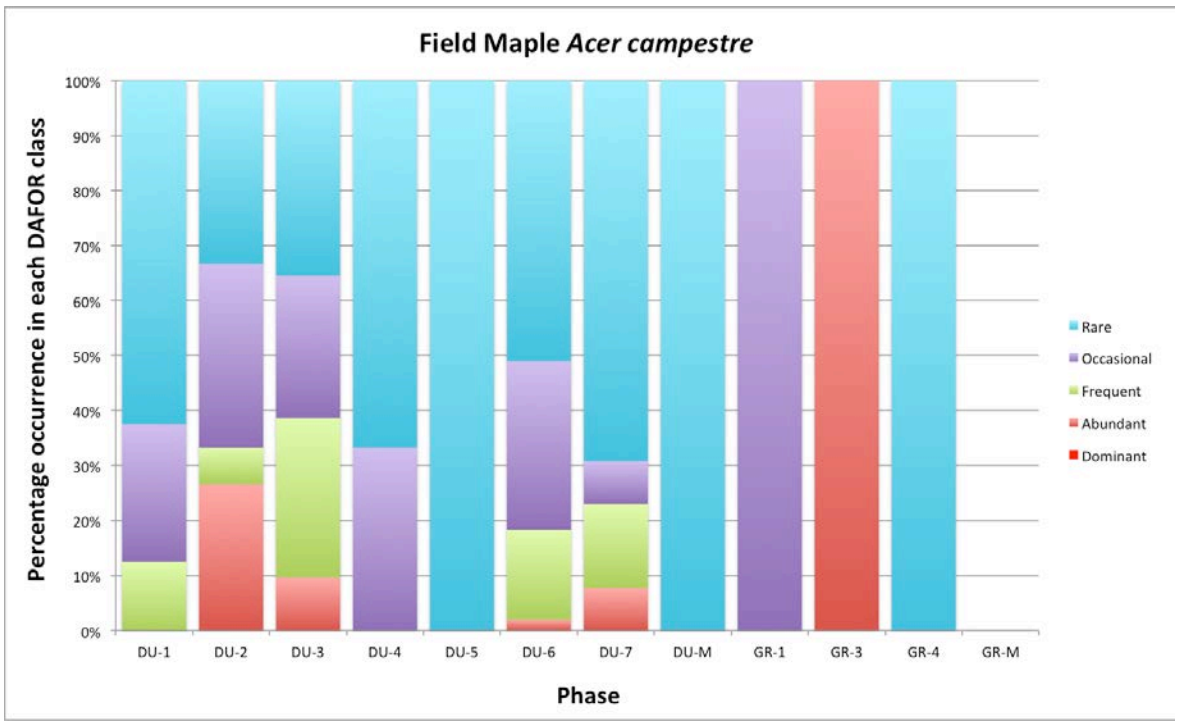

Figure 135.60 - Chart of the percentage frequency in each DAFOR class in each phase for Field Maple *Acer campestre* - [T][SPA][L]

Species + Position + Abundance [SPA]

[T][SPA][L]

4.275. This species was more abundant in some of the older hedgerows of [DU-3] and [DU-4]. In such cases it was a [T][SPA][L] species.

4.276. This is a species much more prevalent over the 1709 enclosure area of Dunnington than on the common or Grimston, being found in 49% of hedges in Dunnington compared with only 9% in the other two areas.

4.277. There is a marked difference in abundance of Field Maple between the hedgerows within the [DU-6] and [DU-7] Phases. In percentage terms it was in 57% of [DU-6] and only 8% of [DU-7] hedgerows.

4.278. This is a species that has wind distributed seed. With few trees of the species in the landscape the assumption is that this was a deliberately planted shrub. In the past it was encouraged as it provided and early nectar source for insects and would have had agricultural advantages. Why there seems to have been a positive planting in [DU-6] that was not repeated on the Common in [DU-7] is unclear.

Gooseberry - *Ribes uva-crispa*

GOOSEBERRY												
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1	3			3	1						8
RO													
RF													
RA													
RD													
No RARE		1	3			3	1						8
% RARE		100	100			100	100						100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		1	3			3	1						8
TOT HGS		47	51			86	155						430
% TOTAL		2	6			3	1						2

Table 137.18 - Summary data for GOOSEBERRY by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.279. Almost ubiquitous.

Growing requirements

4.280. No specific requirements

Features

4.281. Gooseberry has been grown in British gardens since the 13th century but was not recorded in the wild until 1763 (Cambs.). Its distribution has increased since the 1962 *Atlas*, probably due to continued escape of plants from gardens.

4.282. This is clearly a domestic species and its presence in the landscape betrays it as a garden escapee.

Species + Position [SP]

4.283. See [A6-30] and [A1-236]-[A1-242].

[SP][L]

4.284. The overview at [A6-30] shows mainly positions near to the village of Dunnington.

4.285. This association becomes more evident looking at [A1-240] where it is on the eastern boundary of the tofts and crofts that lie east of the village and next to Dunnington Hall (that has already been shown to have Black Currant as an escapee in nearby hedgerows to the Hall). It also occurs along Eastfield Lane and for short distances north down the hedgerows leading to the A166.

Species + Abundance [SA]

4.286. This species is always recorded as single plants that are often difficult to spot as they are never vigorous growers in hedgerows. They are Rare at both landscape [SA][L] and hedgerow scales [SA][H].

Species + Position + Abundance [SPA]

4.287. The distribution of this species across the civil parish strongly suggests that it has slowly, over time, colonised some of the hedgerows close to the village of Dunnington and also next to Dunnington Hall on Eastfield There are other scattered records across the two medieval townships. These may also be indications of former domestic occupation in the area, but, as the Gooseberry is easily transported by birds it could also be example of ‘Bird Dropping Theory’ (technically Avichory).

Gorse - *Ulex europaeus*

GORSE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1					3	1					5
RO													
RF													
RA													
RD													
No RARE		1					3	1					5
% RARE		100					50	100					63
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF							1						1
FA													
FD							1						1
No FREQ							2						2
% FREQ							33						25
AA													
AD													
No ABUN													
% ABUN													
No DOM							1						1
% DOM							17						13
TOTAL No		1					6	1					8
TOT HGS		47					155	10					430
% TOTAL		2					4	10					2

Table 139.19 - Summary data for GORSE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.288. Ubiquitous. Generally lowland, but reaching 640 m on Carnedd Dafydd (Caerns.).

Growing requirements

4.289. Shrub of mildly acidic soils, including leached soils on chalk and limestone, and acidic sands and gravels. It occurs in under-grazed pastures, woodland rides, on sea-cliffs and sand dunes, and on waste ground and railways. It is sometimes planted as hedges or game-shelter, and on roadsides.

Features

4.290. A species typical of heathlands and uplands on sandy or acidic soils. Gorse has increased in abundance with the increase of ruderal habitats and the relaxation of grazing on lowland heaths and cliff-tops since the 1930s. It may be an introduction in some areas where it is mapped as native.

Species + Position [SP]

[SP][L]

4.291. Most of the records on [A6-46] are on Dunnington Common which would be expected to have been rough and heathy prior to enclosure and some Gorse has been encapsulated in the hedgerows formed at that time. It is present on [DU-2] and [DU-3] at the eastern end where the soils seem to be sandier and possibly more heathy vegetation was there when these hedgerows were created.

4.292. Several plants are along Elvington Lane that is an ancient routeway across what would have been common [A1-243] [CF340-CF387] (see Figure 141.61). It is also on the Kexby township boundary at [A1-246][CH364-CH405] and [CH404-CH405] and also [A1-246] [CH371-CH380] (see Figure 202.84)

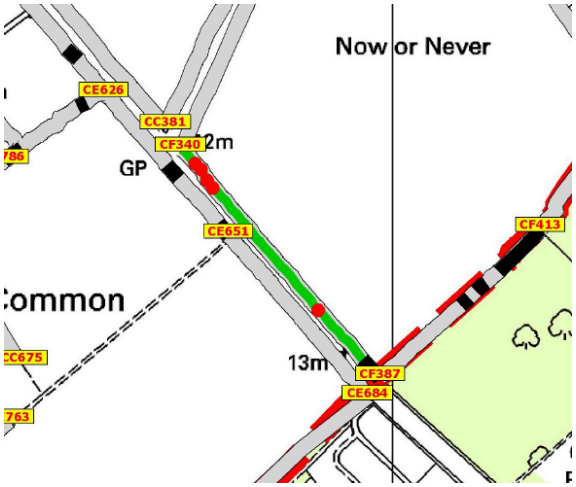

Figure 141.61 – GORSE along Elvington Lane, an ancient routeway across former common land.

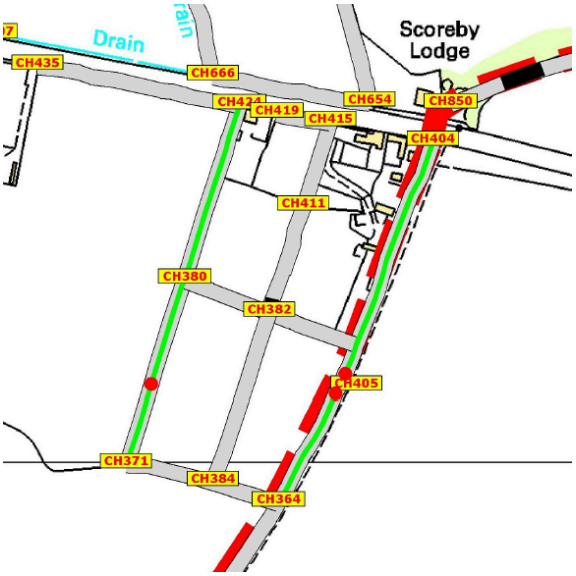

Figure 141.62 – GORSE on the Kexby boundary and one plant on an internal hedgerow.

Species + Abundance [SA]

[SA][L]

4.293. This species was always recorded as Rare. It may be a good colonist of open ground but seems incapable of expansion in competition from the extant shrubs of an established hedgerow.

Species + Position + Abundance [SPA]

[SPA][L]

4.294. This species is preferential for the former heathy conditions that prevailed on Dunnington Common. It has been preserved in the landscape by becoming a component species of some hedgerows.

4.295. As a non-aggressive species it seems to be holding on in a few hedgerows that it was able to colonise when the land was enclosed.

Guelder-rose - *Viburnum opulus*

GUELDER-ROSE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	1	3		3	1	8	6		1		1		24
RO		1											1
RF													
RA													
RD													
No RARE	1	4		3	1	8	6		1		1		25
% RARE	100	67		75	100	100	86		100		100		86
OO				1									1
OF		1											1
OA													
OD													
No OCC		1		1									2
% OCC		17		25									7
FF							1						1
FA													
FD													
No FREQ							1						1
% FREQ							14						3
AA		1											1
AD													
No ABUN		1											1
% ABUN		17											3
No DOM													
% DOM													
TOTAL No	1	6		4	1	8	7		1		1		29
TOT HGS	13	47		51	13	86	155		5		25		430
% TOTAL	8	13		8	8	9	5		20		4		7

Table 142.20 - Summary data for GUELDER-ROSE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.296. Only absent from Scotland(see Figure 143.63). 0-400 m (south of Garrigill, Cumberland).

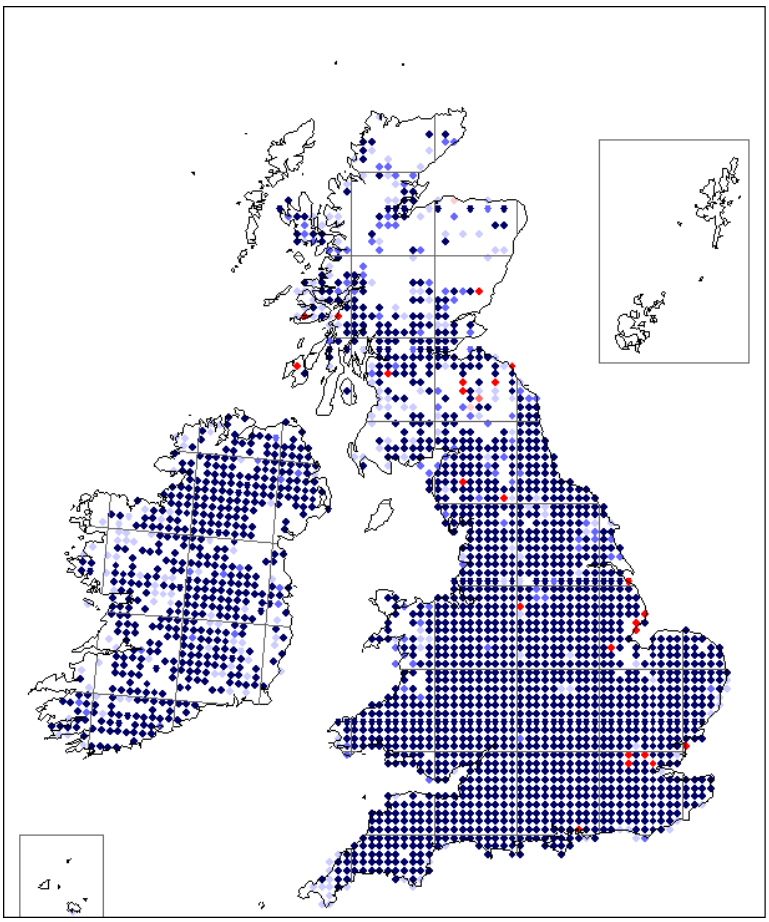

Figure 143.63 - National distribution of Guelder-rose *Viburnum opulus*

Growing requirements

4.297. This deciduous shrub of neutral or calcareous soils is found in woodland, scrub and hedgerows, in fen carr and *Alnus* and *Salix* thickets, and on stream banks, favouring damp places, but also found in dry habitats. This species favours lime-rich soils.

Features

4.298. It is planted in parks and gardens and plants which spread from these sites to the wild sometimes include yellow-fruited cultivars (Lousley, 1976a). Guelder-rose is a species that is preferential for older hedgerows being found in 12 hedgerows pre-[DU-6].

4.299. As a bird dispersed species it has the potential to occur anywhere in the landscape. Some records may allude to this habit, but it does seem to have historic marker attributes.

Species + Position [SP]

[T][SP][L]

4.300. [A6-46] shows Guelder-rose located on many historic hedgerows. On the northern Dunnington Township boundary [A1-249] where it supports English Elm; the interface between Dunnington and Dunnington Common [A1-251], Hagg Lane - [A1-255], Eastfield Lane [A1-257] (adding support to Dogwood) and the Township boundary between Dunnington and *Scoreby* [A1-259] where it supports English Elm and Dogwood.

4.301. The records on [A1-250] relate to recent re-planting and new planting using Guelder-rose as a biodiversity gain species.

Species + Abundance [SA]

[SA][L]

4.302. Guelder-rose is mainly a Rare component of hedgerows

Species + Position + Abundance [SPA]

[T][SPA][L]

4.303. The rarity of this species and its slight preference for older hedgerows makes this a sensitive marker species. It is probably a poor competitor in hedgerows and may not establish well into any gaps that may form.

Hawthorn - *Crataegus monogyna*

HAWTHORN													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		4	4			1	5			2	4	1	21
RO													
RF													
RA													
RD													
No RARE		4	4			1	5			2	4	1	21
% RARE		10	8			1	3			29	18	50	5
OO	1	3	3	2		4	9					1	23
OF													
OA													
OD						1							1
No OCC	1	3	3	2		4	9					1	24
% OCC	8	8	6	15		6	6					50	6
FF		4	3	2	1	10	14	1	2	1	1		39
FA			1	1		1							3
FD	1	1	2		1	7	4						16
No FREQ	1	5	6	3	2	18	18	1	2	1	1		58
% FREQ	8	13	13	23	22	21	12	10	40	14	5		14
AA	3	10	4		3	15	40	1		1	4		81
AD	6	12	15	5		33	34	2	1	1	1		111
No ABUN	9	22	19	5	3	48	74	3	1	2	5		192
% ABUN	75	55	40	38	33	56	49	30	20	29	23		48
No DOM	1	6	16	3	4	13	44	6	2	2	12		109
% DOM	8	15	33	23	44	15	29	60	40	29	55		27
TOTAL No	12	40	48	13	9	85	150	10	5	7	22	2	404
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	92	85	94	93	69	99	97	100	100	100	88	67	94

Table 145.21 - Summary data for HAWTHORN by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.304. Ubiquitous 0-610 m (Melmerby High Scar, Cumberland).

Growing requirements

4.305. No specific requirements.

Features

4.306. A deciduous shrub or tree of hedgerows, scrub and wood-borders, and as an understorey in open woodland on a wide range of soils. It can persist as scattered bushes in grazed sites, spreading rapidly when grazing declines or ceases. Its prolifically produced fruits are an important winter food for birds.

4.307. This species has been widely planted as a hedging plant for many centuries, and the limits of its native distribution are unclear. In N. Scotland it is often confined to the vicinity of habitation, and in some areas is certainly introduced. Its distribution is stable.

4.308. Hawthorn is 'the hedge shrub'. Ubiquitous and often specified as the species of choice in manuals of agricultural husbandry.

Species + Position [SP]

[SP][L]

4.309. Found everywhere across the study area.

Species + Abundance [SA]

[SA][L]

4.310. As with English Elm this species is tending toward the Abundant end of the scale. It is hardly ever recorded as Rare and on 192 hedgerows across the area it was classed as Abundant (48% of 430 hedgerows)

Species + Position + Abundance [SPA]

[SPA][L]

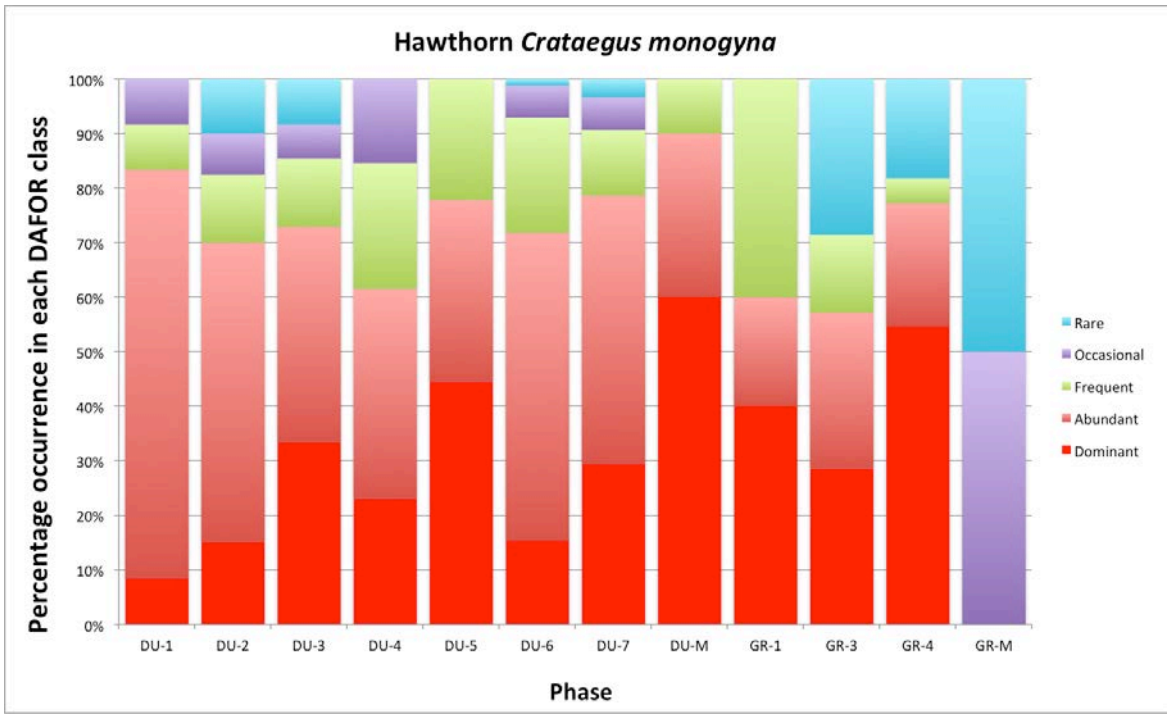

Figure 147.64 - Chart of the percentage frequency in each DAFOR class in each phase for Hawthorn *Crataegus monogyna* - [T][SPA][L]

4.311. Hawthorn is an almost ubiquitous species, recorded in almost every hedgerow throughout the entire study area. In addition, it has a tendency to be Abundant where found. This is clearly a hedging plant of choice in every period.

Hazel - *Corylus avellana*

HAZEL													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	1	7	9	6	2	29	25	1	2	2	5		89
RO													
RF													
RA						1							1
RD						2							2
No RARE	1	7	9	6	2	30	25	1	2	2	5		92
% RARE	14	35	41	55	100	64	64	100	100	100	56		56
OO	2	4	4	2		9	8				2		31
OF		3	1										4
OA						1							1
OD													
No OCC	2	7	5	2		10	8				2		36
% OCC	29	35	23	18		20	21				22		22
FF	2	2	6			8	4				2		24
FA		1											1
FD	1			1			1						3
No FREQ	3	3	6	1		8	5				2		28
% FREQ	43	15	27	9		16	13				22		17
AA	1	2	1	1									5
AD		1	1	1			1						4
No ABUN	1	3	2	2			1						9
% ABUN	14	15	9	18			3						5
No DOM													
% DOM													
TOTAL No	7	20	22	11	2	50	39	1	2	2	9		165
TOT HGS	13	47	51	14	13	86	155	10	5	7	25		430
% TOTAL	54	43	43	79	15	58	25	10	40	29	36		38

Table 148.22 - Summary data for HAZEL by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.312. Ubiquitous. 0-640 m (Atholl, E. Perth).

Growing requirements

4.313. A deciduous suckering shrub of dry or damp, calcareous to mildly acidic soils, but favouring moist, base-rich conditions.

Features

4.314. It is native in the understorey of many woods, in scrub, hedgerows, on river banks, limestone pavement, cliffs and gullies, but it is also widely planted in copses and hedgerows.

4.315. Hazel is a valued shrub for its nuts and twiggy growth used in basket weaving etc. It is wind pollinated and the nuts are dispersed by birds and small mammals.

Species + Position [SP]

[SP][L]

4.316. [A6-11] shows this to be widely distributed across the landscape.

[SP][H]

4.317. At the hedgerow level there are some places where there are closely spaced bushes and others where there are individual plants widely spaced. No obvious signs of regular spaced planting.

Species + Abundance [SA]

[SA][L]

4.318. At the landscape level this species is very frequent, 165 hedgerows out of 430 = 38%; [A6-11] and [A7-7].

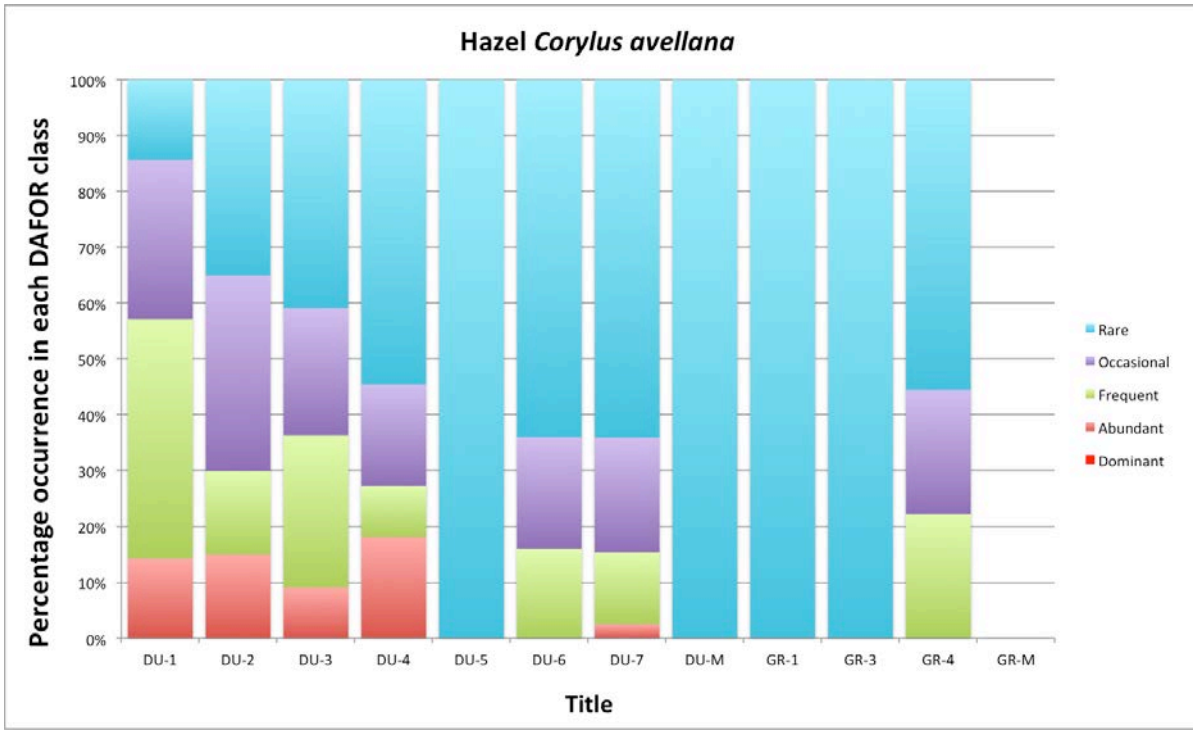

Figure 149.65 - Chart showing the differences is species abundance in each Phase for Hazel *Corylus avellana* - [T][SPA][L]

Species + Position + Abundance [SPA]

[SPA][L]

4.319. The pattern of Species, Position and Abundance for this species suggests it is preferential for older hedgerows. This could be either because if was actively encouraged, or because these hedgerows have been there so long that Hazel has expanded its [SPA][H] range into them over time.

4.320. The [SPA] analysis of the more recent hedgerows suggests deliberate planting as it seems unlikely that sufficient gaps will have opened up since 1709 to account for the natural colonisation of hedgerows in these later Phases.

4.321. This is an uncommon species (1st decile) and the surveys generally waypointed every bush. This is reflected at [A1-280] to [A1-299].

4.322. Although many hedgerows seem to have a few individual bushes, there are many occasions where there is clumping (see Figure 151.66). This may indicate small mammal vectors and the more spaced out records may be bird dispersed plants.

4.323. There does not seem to be any evidence for deliberate and regular spacing of plants.

4.324. It has a number of signatures and is a critical species that aids hedgerow interpretation.

4.325. It was found in every phase, ranging from being present in 10% of hedgerows in [DU-M] to 79% in [DU-4].

[T][SPA][L]

4.326. The relationship with species and abundance for this species by phase [T] is as shown at Table 148.22 and Figure 149.65. In the earlier phases the species is generally more frequent and abundant

4.327. Over the entire survey area there was a tendency for the species to be found as Rare to Occasional with 28 hedgerows having this species as Frequent.

[T][SPA][H]

4.328. As a general rule this species was more often recorded as Abundant in older hedgerows [DU-1] to [DU-4], being recorded up to Frequent in [DU-6] and [DU-7]. It was a Rare species in Grimston. This indicates either a preferential encouragement from history that has been maintained to the present, or that it may have been less, or more, common

historically and is now more, or less, abundant (see Figure 13.6). The current supposition is that it was probably more common historically because of its value for food and twigs for weaving Although it has possibly also become more common because of the length of time since they were established allowing more time for natural spread.

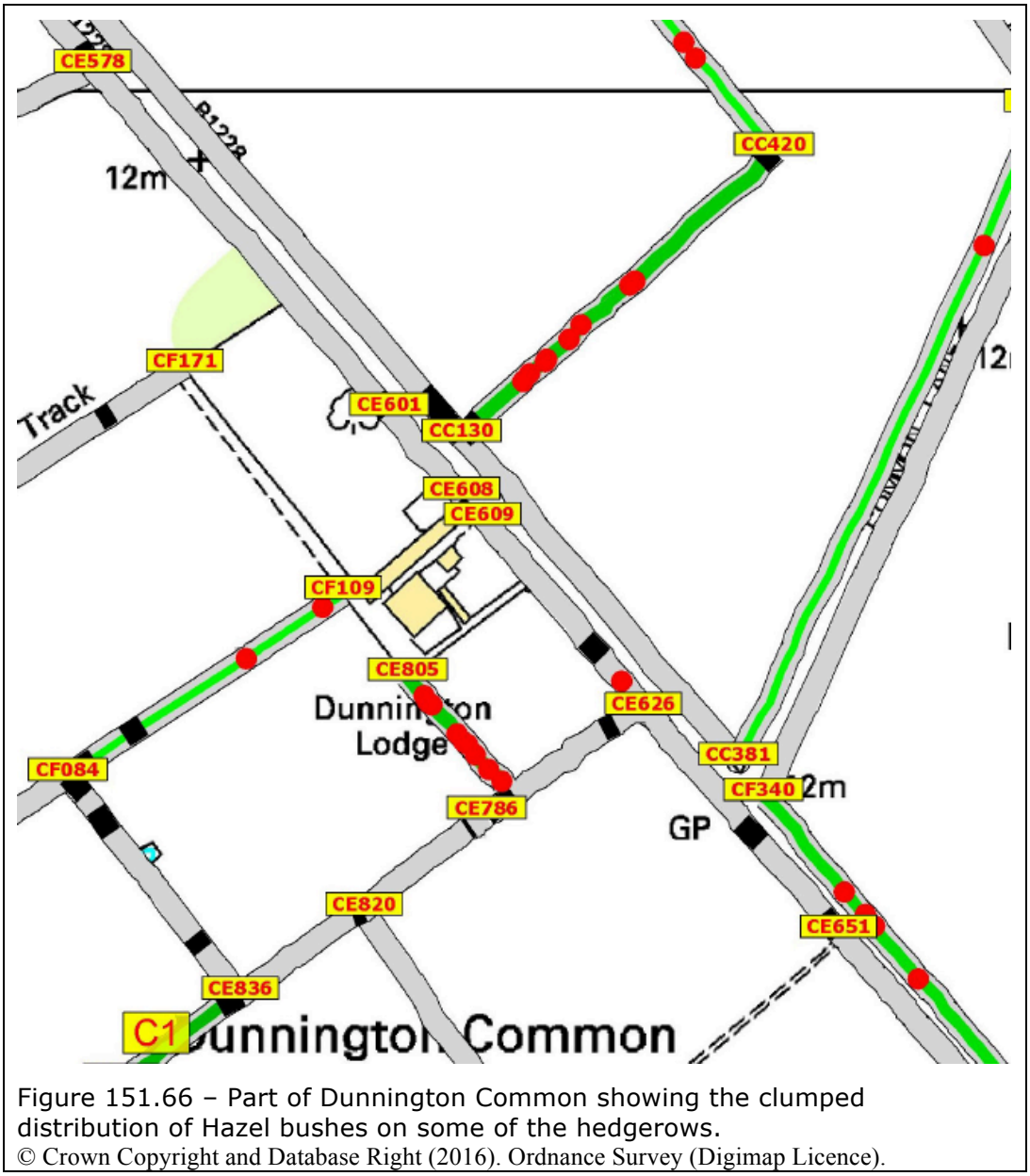

Figure 151.66 – Part of Dunnington Common showing the clumped distribution of Hazel bushes on some of the hedgerows.

Holly - *Ilex aquifolium*

HOLLY													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	3	5	8	5	1	23	27	1		1	3		78
RO													
RF													
RA													
RD				1									1
No RARE	3	5	8	6	1	23	27	1		1	3		79
% RARE	75	42	80	86	100	72	68	100		100	75		70
OO		4	2			7	7				1		21
OF		1											1
OA		1				1							2
OD		1											1
No OCC		7	2			8	7				1		25
% OCC		58	20			25	18				25		22
FF						1	1						2
FA													
FD	1						1						2
No FREQ	1					1	2						4
% FREQ	25					3	5						4
AA				1			1						2
AD							2						2
No ABUN				1			3						4
% ABUN				14			8						4
No DOM							1						1
% DOM							3						1
TOTAL No	4	12	10	7	1	32	40	1		1	4		113
TOT HGS	13	47	51	14	13	86	155	10		7	25		430
% TOTAL	31	26	20	50	8	37	26	10		14	16		26

Table 152.23 - Summary data for HOLLY by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.329. Almost ubiquitous. 0-600 m (Eel Crags, Cumberland).

Growing requirements

4.330. An evergreen shrub of deciduous woodlands, especially those on acidic soils in which *Fagus* and *Quercus* predominate; often a frequent or locally dominant undershrub but rarely dominating the canopy

Features

4.331. . Its susceptibility to browsing can limit regeneration. It is also found in wood-pasture, scrub and hedgerows, and on

ledges of acidic cliffs, and is often planted in amenity areas and parkland.

4.332. Evergreen Holly is a significant species in the landscape. It is also one of the species that has an aggressive character. Being evergreen, it has a competitive edge in the springtime when it can overshadow and suppress the growth of deciduous shrubs. There are many occasions where a Holly tree exists and, within the hedgerow on either side there is an ever expanding Holly component (see Figure 153.67).

Figure 153.67 – An example panorama of holly expanding outwards from an original hedgerow tree.

Species + Position [SP]

[SP][L]

4.333. Holly does not appear to have any particular pattern to its distribution either at the landscape scale [SA][L] or at the hedgerow level [SA][H].

Species + Abundance [SA]

[SA][L]

4.334. Holly is normally Rare (79 surveyed hedgerows or 70% of 113 hedgerows surveyed had Holly).

Species + Position + Abundance [SPA]

[SPA][L]

4.335. Holly is an uncommon species and was normally waypointed at every occurrence as can be seen at [A1-300] to [A1-318]. The lack of obvious pattern suggests no deliberate planting and its occurrence is probably from bird dispersal.

Hornbeam *Carpinus betulus*

HORNBEAM													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			1										1
RO													
RF													
RA													
RD													
No RARE			1										1
% RARE			100										100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No			1										1
TOT HGS			51										430
% TOTAL			2										0

Table 154.24 - Summary data for HORNBEAM by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.336. An uncommon species in Yorkshire (see Figure 155.68). Lowland as a native, but to 380m as an alien on Great Mell Fell (Cumberland).

Growing requirements

4.337. A long-lived deciduous tree, found as native in both pure and mixed woodland on base-poor sandy or loamy clays, or clay-with-flints.

Features

4.338. Within its native range, coppiced plants are often the dominant member of the shrub layer in *Quercus* woods. It is

also extensively planted in woodlands, on roadsides, in amenity areas and for hedging, both within and outside its native range.

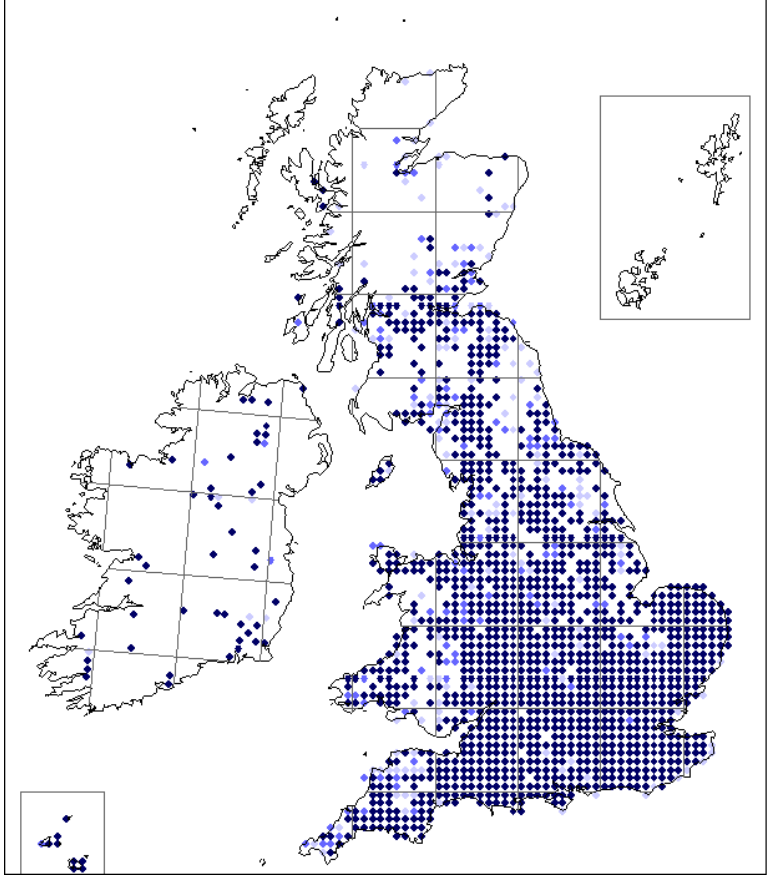

Figure 155.68 - National distribution of Hornbeam *Carpinus betulus*

Species + Position [SP]

4.339. Only one plant recorded on the northern roadside hedgerow near to a tree nursery (see [A1-319][BS869-BX180]).

Species + Abundance [SA]

4.340. Only one plant.

Species + Position + Abundance [SPA]

4.341. No [SPA] association except to the probable origin from the nearby tree nursery.

Horse Chestnut *Aesculus hippocastea*

HORSE CHESTNUT													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR						1							1
RO													
RF													
RA													
RD													
No RARE						1							1
% RARE						100							100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No						1							1
TOT HGS						86							430
% TOTAL						1							0

Table 156.25 - Summary data for HORSE CHESTNUT by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.342. A non-native with an almost ubiquitous distribution. Generally lowland, but reaching 505m at Ashgill (Cumberland).

Growing requirements

4.343. A tree of parkland, large gardens and estates, churchyards, urban streets and village greens; also a constituent of deciduous and mixed woodland. It is sometimes self-sown in scrubby areas, waste ground or rough grassland, and occasionally regenerates in woodland, but is rarely fully naturalised.

Features

4.344. An uncommon species in a hedgerow and often planted as a tree into recent hedgerows as an ornamental addition.

Species + Position [SP]

4.345. Only recorded as a shrub in one hedgerow (see [A1-321].

4.346. As a tree it is on a number of hedgerows in Dunnington [A1-320] to [A1-323].

Species + Abundance [SA]

4.347. Between 1 and 3 plants on a few hedgerows in the study area.

Species + Position + Abundance [SPA]

4.348. Its occurrence is probably down to individual owner preferences.

Ivy - *Hedera helix*

IVY													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1	6	2		10	6	1	1				27
RO													
RF													
RA													
RD						1							1
No RARE		1	6	2		10	6	1	1				28
% RARE		33	30	22		55	46	50	100				41
OO			5	1		2	3						11
OF													
OA		1											1
OD							1						1
No OCC		1	5	1		2	4						13
% OCC		33	25	11		10	31						19
FF			4			4	2						10
FA													
FD								1					1
No FREQ			4			4	2	1					11
% FREQ			20			20	15	50					16
AA	1		4	5		3	1						14
AD			1	1									2
No ABUN	1		5	6		3	1						16
% ABUN	100		25	67		15	8						23
No DOM		1											1
% DOM		33											1
TOTAL No	1	3	20	9		20	13	2	1				69
TOT HGS	13	47	51	14		86	155	10	5				430
% TOTAL	8	6	39	64		23	8	20	20				16

Table 158.26 - Summary data for IVY by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.349. Almost ubiquitous. 0-610m (Mourne Mountains, Co. Down).

Growing requirements

4.350. It may carpet the ground in secondary woodland. It generally favours basic to moderately acidic soils.

Features

4.351. An evergreen perennial woody climber most characteristic of woodland, scrub and hedgerows, but also common on walls, rock outcrops and cliffs. It is highly palatable

to deer and stock, and in grazed upland areas becomes restricted to inaccessible rock outcrops.

Most survey techniques completely ignore the presence of Ivy within hedgerows. Ivy is a frequent component of many hedgerows, arriving as bird dispersed seed. It is shade tolerant and starts by growing along the ground. Then, when it starts to climb into the hedge shrubs or up hedgerow trees it begins to fruit and provide more seeds for dispersal.

4.352. It is a relatively aggressive species that can grow so well in the shrubs that it appears on the outer sides and top of the hedgerow, where, in some cases, it can be recorded as visually the Dominant species, suppressing the more normal dominant of Hawthorn.

Species + Position [SP]

[T][SP][L]

4.353. There is a tendency for Ivy to be preferential for the older hedgerows of the township boundaries and some of the internal field division boundaries (see [A6-15]).

Species + Abundance [SA]

[SA][H]

4.354. The species can vary greatly in terms of its Abundance in the hedgerows [SA][H] and occurs across the study area

Species + Position + Abundance [SPA]

[SPA][H]

4.355. The ability of Ivy to persist within a hedgerow seems to be related to how heavily managed the hedgerow is. A good example of abundant Ivy can be found along the eastern hedgerow of Intake Lane. This is a very heavily managed and very compact hedgerow where the Ivy has become a Dominant component in the absence of competition from the leaves of other hedge plants.

Lilac - *Syringa vulgaris*

LILAC													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			1	1			2						4
RO													
RF													
RA													
RD													
No RARE			1	1			2						4
% RARE			100	100			67						80
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF							1						1
FA													
FD													
No FREQ							1						1
% FREQ							33						20
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No			1	1			3						5
TOT HGS			51	14			155						430
% TOTAL			2	7			2						1

Table 160.27 - Summary data for LILAC by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.356. A non-native species with few records in Yorkshire (see Figure 161.69).

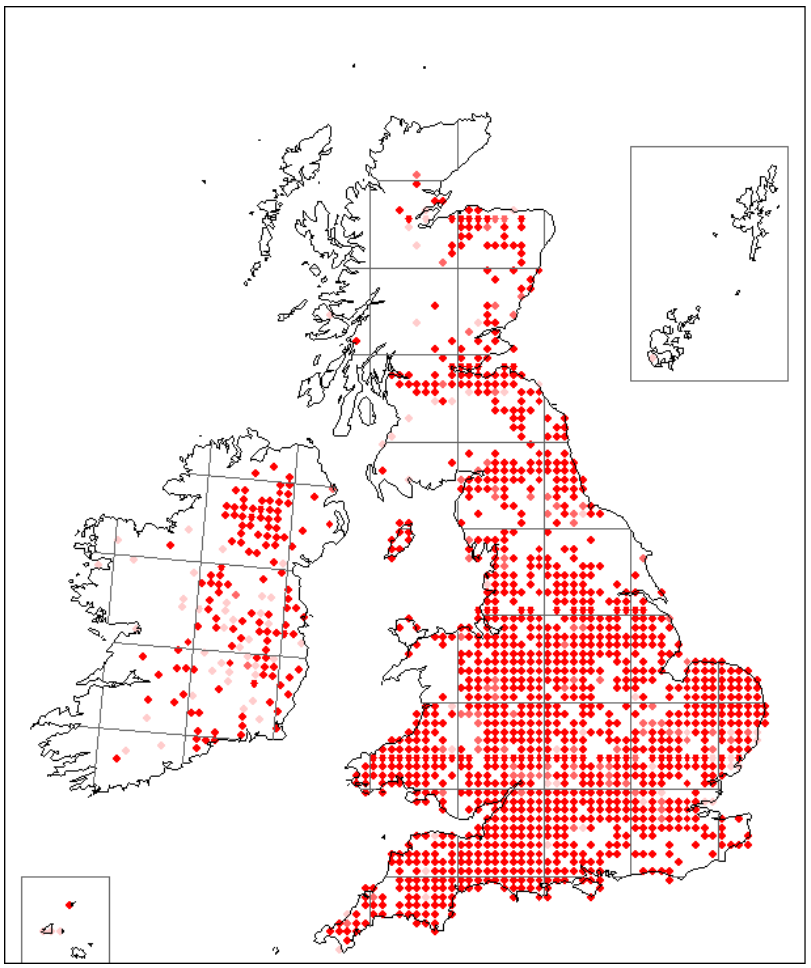

Figure 161.69 - National distribution of Lilac *Syringa vulgaris*

Growing requirements

4.357. A strongly suckering deciduous shrub, occurring as a relic of cultivation in sites of former habitation, or more or less naturalised in hedges, on roadsides, railway banks, tips and waste ground.

Features

4.358. Probably a garden escapee. It is occasionally planted for hedging well away from habitation. Reproduction is mostly vegetative, and establishment from seed is rare. Lowland.

Species + Position [SP]

[SP][L]

4.359. It is associated with places of habitation which explains its presence in hedgerows.

Species + Abundance [SA]

[SA][L]

4.360. Relatively little data, but generally Rare.

Species + Position + Abundance [SPA]

[SPA][L]

4.361. Presumed to be a domestic escape, found rarely near habitation in low quantities.

Lime - *Tilia* sp.

LIME													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			1								1		2
RO													
RF													
RA													
RD													
No RARE			1								1		2
% RARE			100								100		67
OO							1						1
OF													
OA													
OD													
No OCC							1						1
% OCC							100						33
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No			1				1				1		3
TOT HGS			51				155				25		430
% TOTAL			2				1				4		1

Table 163.28 - Summary data for LIME by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.362. This species was not determined to species level and may have been a hybrid. Largely introduced and almost ubiquitous. 0-400 m (Craig y Cilau, Brecs.).

Growing requirements

4.363. This species occurs as a native in old, mixed deciduous woodland on calcareous or, rarely, acidic soils, typically as a large tree or coppice stool. It also grows on cliff ledges, and as a planted tree on roadsides, in gardens, parkland and plantations.

Features

4.364. Seedlings are frequent, but saplings rare. Vegetative reproduction is by new shoots from the tree base.

4.365. An ornamental species not commonly planted in hedgerows.

4.366. There are a number of forms of lime tree present in the landscape. The most critical species being the Small-leaved Lime *Tilia cordata*. It is this that is generally regarded as an ancient woodland indicator species. The currently planted ornamental varieties are either the straight common lime *Tilia platyphyllos* or the hybrid between the two, *Tilia* x *europaeus*.

4.367. The specimens recorded during the survey at Dunnington were either Common Lime or the hybrid.

Species + Position [SP]

[SP][L]

4.368. Almost certainly recent ornamental planting of trees along Dunnington Lane.

Species + Abundance [SA]

[SA][L]

4.369. Infrequent where planted

Species + Position + Abundance [SPA]

[SPA][L]

4.370. This has a distribution that suggests deliberate ornamental planting in relatively recent times.

Pedunculate Oak - Quercus robur

PEDUNCULATE OAK													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	2	6	8	3	3	16	34	1	1	2	84		84
RO		1	1								2		2
RF			1								1		1
RA													
RD													
No RARE	2	7	10	3	3	16	34	1	1	2	87		87
% RARE	25	70	67	50	60	50	48	25	50	100	53		53
OO	6	1	5	1	1	10	23	1	1		49		49
OF													
OA						1					1		1
OD													
No OCC	6	1	5	1	1	11	23	1	1		50		50
% OCC	75	10	33	17	20	34	32	25	50		31		31
FF		2		2	1	4	11				20		20
FA													
FD													
No FREQ		2		2	1	4	11				20		20
% FREQ		20		33	20	13	15				12		12
AA						1	3	2			6		6
AD													
No ABUN						1	3	2			6		6
% ABUN						3	4	50			4		4
No DOM													
% DOM													
TOTAL No	8	10	15	6	5	32	71	4	2	2	163		163
TOT HGS	13	47	51	14	13	86	155	10	5	7	430		430
% TOTAL	62	21	29	43	38	37	46	40	40	29	38		38

Table 165.29 - Summary data for PEDUNCULATE OAK by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.371. Almost ubiquitous. 0-450 m (Talgarth, Brecs.)

Growing requirements

4.372. A long-lived, deciduous tree of high forest, coppice woodland and ancient wood-pasture. It grows on a wide range of soils, typically those which are heavy and fertile, but does not thrive on thin soils over limestone or acidic peat. It is fairly tolerant of waterlogging, growing at fen margins and in *Alnus* woodland.

Features

4.373. It is very widely planted in hedges and woodland. A popular and favoured hedgerow tree.

Species + Position [SP]

[SP][L]

4.374. Both trees and shrub forms of the species are distributed across the study area with a few concentrations. As already discussed for Ash, Pedunculate Oak is also found on hedgerows as a tree with no representation in the hedge, as a shrub with no trees present and as a combination of both shrub and tree in the same hedgerow.

Species + Abundance [SA]

[SA][L]

4.375. Rarely found as Abundant and normally as irregularly scattered bushes of small size.

Species + Position + Abundance [SPA]

[M][SPA][L]

4.376. Pedunculate Oak is a species that is part of the hedge component as well as featuring as a significant hedgerow tree throughout the entire study area. Further detailed work would be required to determine any association of shrub oak being associated with current or former potential oak trees within hedgerows. Acorns are heavy and normally drop within the immediate canopy of the parent tree. The presence of oak in the hedge component could result from the movement of acorns by birds and small mammals. This would mean that oak seedlings establishing in the hedgerow could have been moved considerable distances from the parent trees.

Privet - *Ligustrum vulgare*

PRIVET													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1	2	1			2				1		7
RO													
RF													
RA		1											1
RD			1										1
No RARE		2	3	1			2				1		9
% RARE		100	75	50			100				100		75
OO				1		1							2
OF													
OA													
OD													
No OCC				1		1							2
% OCC				50		100							17
FF			1										1
FA													
FD													
No FREQ			1										1
% FREQ			25										8
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		2	4	2		1	2				1		12
TOT HGS		47	51	14		86	155				25		430
% TOTAL		4	8	14		1	1				4		3

Table 167.30 - Summary data for PRIVET by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.377. See Figure 168.70 and Figure 168.71. 0-490 m (Craig y Cilau, Brecs.).

Growing requirements

4.378. A deciduous to semi-evergreen shrub found as a native in hedgerows, woodland and scrub, preferring well-drained, calcareous or base-rich soils.

Features

4.379. It is also often planted, particularly in hedges and woodland, and occurs as a garden escape and a relic of cultivation.

4.380. The Privet plants across the site were not determined to species. They could have been either Wild Privet *Ligustrum vulgare* or Garden Privet *L. ovalifolium.* The UK distributions of both are at Figure 168.70 and Figure 168.71.

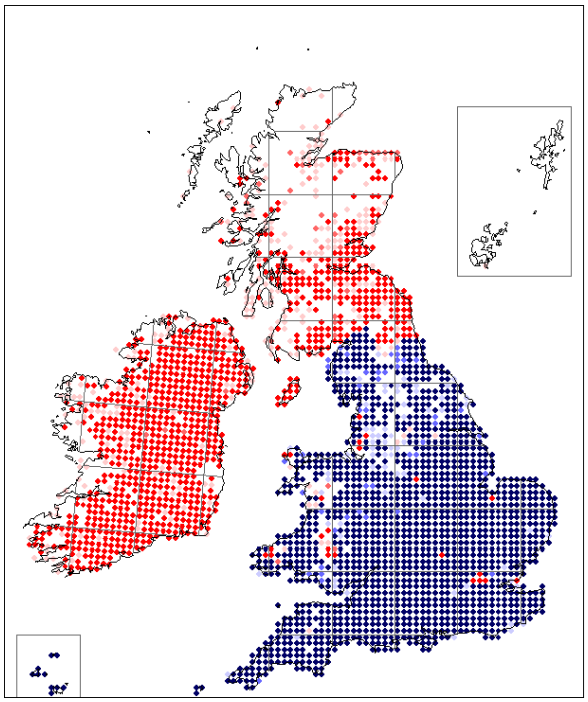

Figure 168.70 – Distribution of Wild Privet (Red are introductions)

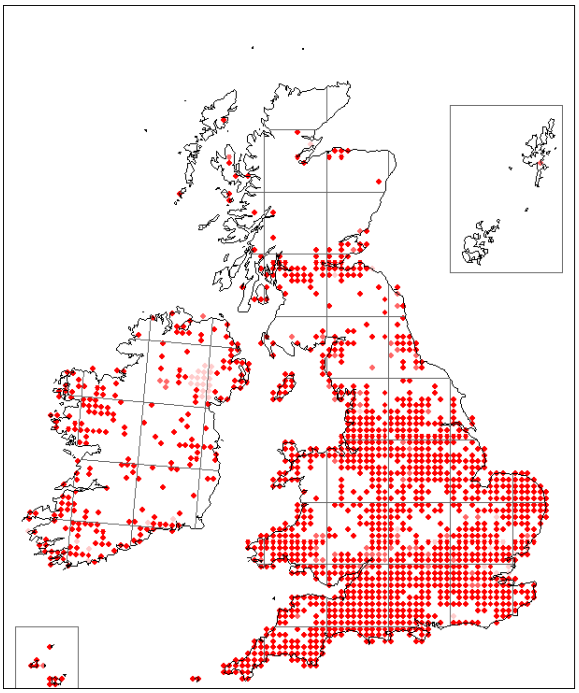

Figure 168.71 – Distribution of the introduced Garden Privet.

Species + Position [SP]

[SP][L]

4.381. The pattern of records shown on [A6-17] indicate there are probably some records of native Wild Privet and others that are close to habitation and may be escapes, or domestic in origin. Examples of the former are along the A166, Dunnington Lane, Intake Lane and Eastfield Lane

Species + Abundance [SA]

[SA][L]

4.382. Only ever recorded as Rare to Frequent

Species + Position + Abundance [SPA]

[SPA][L]

4.383. No apparent [SPA] association.

Purging Buckthorn - *Rhamnus cathartica*

PURGING BUCKTHORN													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		2	1				4	1			1		9
RO													
RF													
RA													
RD													
No RARE		2	1				4	1			1		9
% RARE		100	100				100	100			100		90
OO													
OF													1
OA													
OD													
No OCC													1
% OCC													10
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		2	1				4	1			1		9
TOT HGS		47	51				155	10			25		430
% TOTAL		4	2				3	10			4		2

Table 169.31 - Summary data for PURGING BUCKTHORN by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.384. Rare in Yorkshire, reaching its northern limit here (see Figure 170.72). 0-490 m (Craig y Cilau, Brecs.).

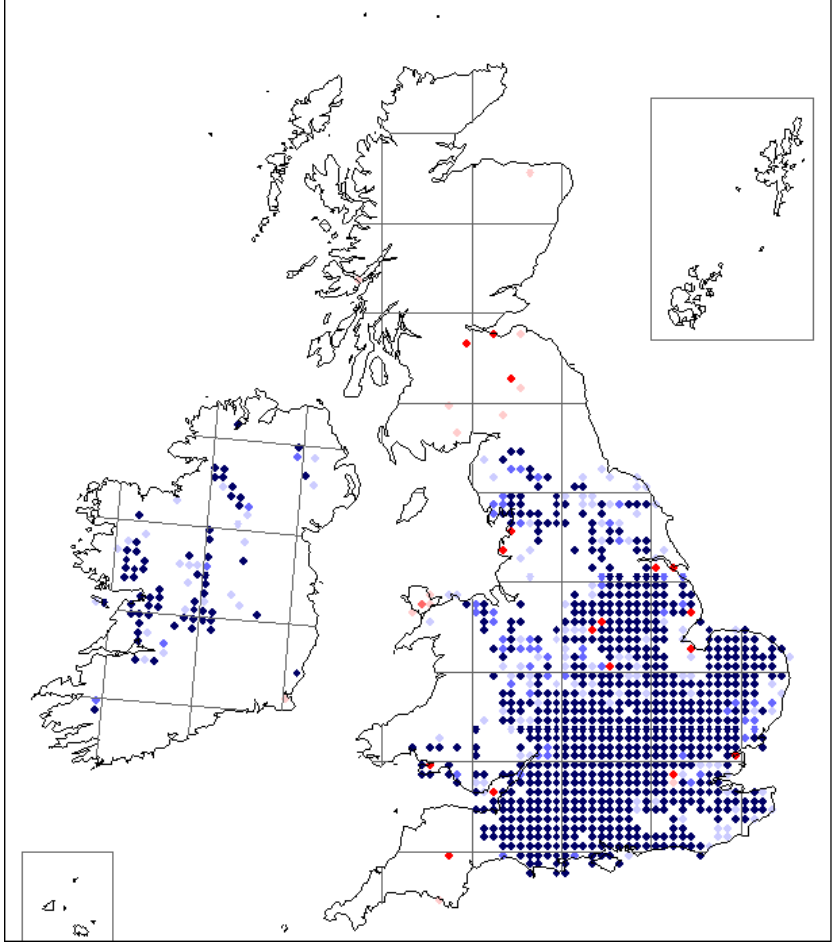

Figure 170.72 - Atlas distribution of Purging Buckthorn *Rhamnus cathartica*.

Growing requirements

4.385. A deciduous to semi-evergreen shrub found as a native in hedgerows, woodland and scrub, preferring well-drained, calcareous or base-rich soils. It is also often planted, particularly in hedges and woodland, and occurs as a garden escape and a relic of cultivation.

Features

4.386. A significant species in the study area. Purging Buckthorn *Rhamnus cathartica*[9] is relatively rare in Yorkshire being on its geographic limit that extends north mainly through the Vale of York and the Magnesian limestone.

[9] In some books it is *Rhamnus catharticus*.

4.387. This species can be dioecious with separate male and female plants, but can also have male, female and hermaphrodite flowers on the same plant. At Dunnington the bushes appear to be either predominantly male or female as some bushes are covered in fruit while others have none and bore male flowers. The implications for colonisation and spread for Purging Buckthorn *Rhamnus cathartica* by seed are that the distance between male and female plants needs to allow pollination (although Lang (1987) reports that some bushes can have both male and female flowers)and, once the female plants have set seed there needs to be a suitable vector to move the seeds to new locations.

4.388. In *Scoreby* this species was only found on the medieval township boundary hedgerows. It is not present in any other refuges now, only within these specific hedgerows. Three scenarios exist for why it is where it is now.

4.388.a It arrived recently from a refuge that is now gone. There are no current internal refuges, and it could have come from one of the other township boundary hedgerows. If this is plausible why has it not colonised any internal hedgerows from the township boundaries in the intervening period?

4.388.b It was already in these early boundaries that were retained when the medieval open fields were laid out, removing any potential scrubby areas with this species.

4.388.c It could having been naturally present in the locality when these early hedgerows were created and was incorporated, or it was deliberately put into the hedgerow for its medicinal purpose (the berries are a powerful purgative, hence its common name).

Species + Position [SP]

[SP][L]

4.389. In Dunnington there are a number of ancient boundaries that it occurs on. The Township boundary between Dunnington and *Scoreby* as shown at Figure 172.73 and Figure 172.74. Figure 172.73 also shows its presence along the north side of Intake Lane. At both locations on this figure, it is in combination with English Elm.

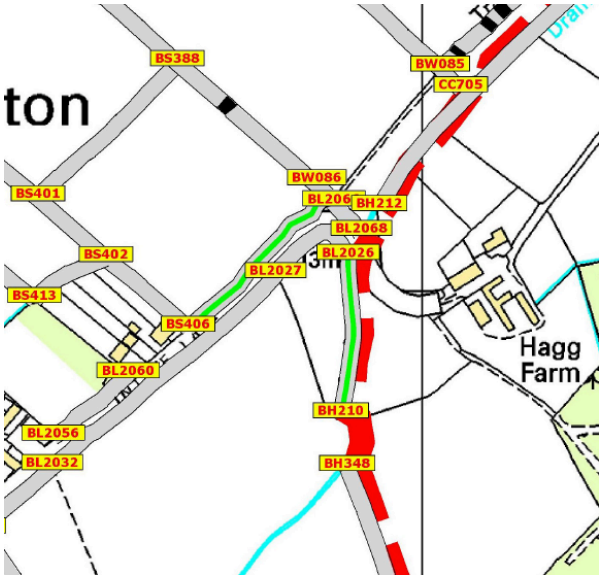

Figure 172.73 – PURGING BUCKTHORN along Intake Lane and the township boundary between Dunnington and *Scoreby*.

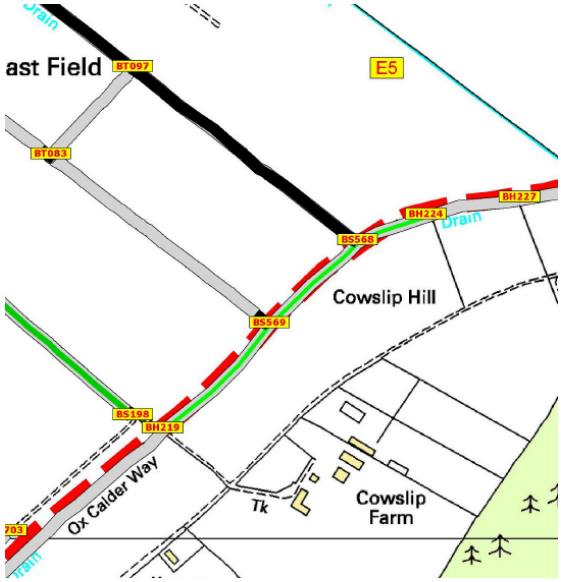

Figure 172.74 – PURGING BUCKTHORN along Ox Calder Way - the township boundary between Dunnington and *Scoreby*.

4.390. Other records are clearly of more recent plantings/ seedings like the one along the disused railway line at [A1-367][CH287-CH300] and [A1-366] [CE486-CE578] and [CE786-CE836] as well as [A1-365][CE384-CE425] and [A1-368][CH172-CH176].

4.391. The record at the southern end of Common Road, near the junction with the A1079 is likely to be an historic instance.

4.392. Hedgerow [A1-370]-[A1-371][BS198-BS243] is suggested as an unrecognised Township boundary. Stephen Moorhouse suggested the alignment of this at Figure 7.2. Nothing botanically supports this. Whereas there is botanical evidence for the suggested alignment above from the presence of Purging Buckthorn, supported in combination with Dogwood *Cornus sanguinea* and Guelder-rose *Viburnum opulus*.

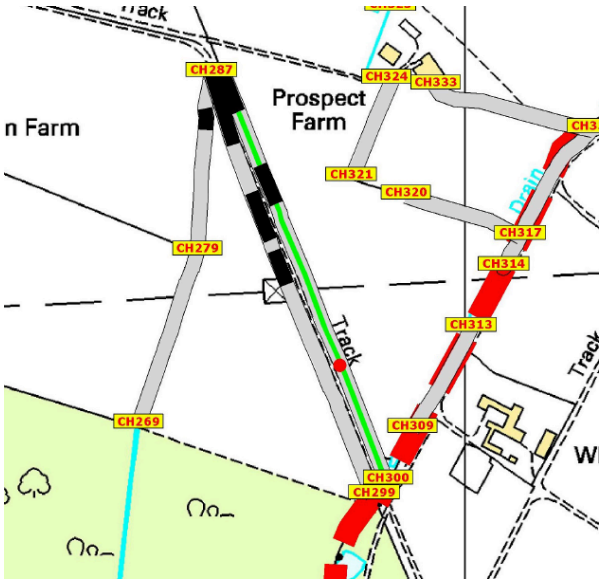

Figure 173.75 – Probable recent introduction or colonisation by PURGING BUCKTHORN along the disused railway line.

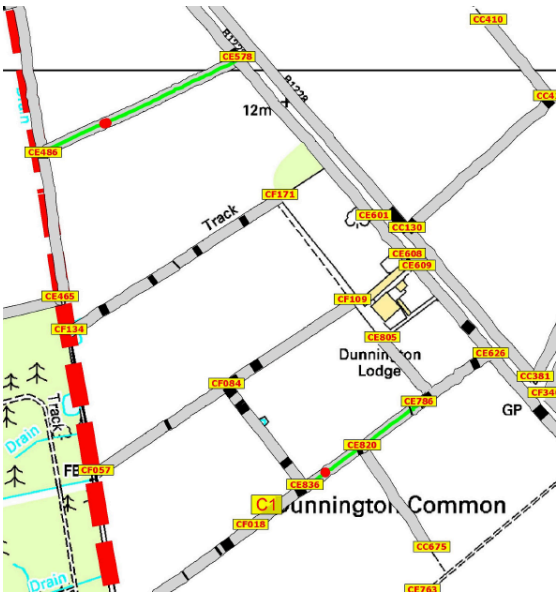

Figure 173.76 – PURGING BUCKTHORN has probably been recently introduced on these hedgerows.

Species + Abundance [SA]

[SA][L]

4.393. This species is nearly always present as scattered plants across the landscape and also as a rarity on hedgerows where it occurs.

Species + Position + Abundance [SPA]

[SPA][L]

4.394. Purging Buckthorn *Rhamnus cathartica* is primarily a [SPA] species being confined to township boundary and other medieval hedgerows.

ROSES

Dog Rose - *Rosa canina* agg.

DOG ROSE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	4	12	11	3	2	28	27	3	3	2	6	2	103
RO		1											1
RF													
RA													
RD													
No RARE	4	13	11	3	2	28	27	3	3	2	6	2	104
% RARE	36	48	38	75	40	58	41	100	100	67	46	100	49
OO	6	11	11	1	2	15	27				6		79
OF			1										1
OA													
OD													
No OCC	6	11	12	1	2	15	27				6		80
% OCC	55	41	41	25	40	31	41				46		37
FF	1	3	6		1	5	11			1	1		29
FA													
FD													
No FREQ	1	3	6		1	5	11			1	1		29
% FREQ	9	11	21		20	10	17			33	8		14
AA							1						1
AD													
No ABUN							1						1
% ABUN							2						0
No DOM													
% DOM													
TOTAL No	11	27	29	4	5	48	66	3	3	3	13	2	214
TOT HGS	13	47	51	14	13	86	155	10	5	7	25	3	430
% TOTAL	85	57	57	29	38	56	43	30	60	43	52	67	50

Table 174.32 - Summary data for DOG ROSE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.395. Dog Rose *Rosa canina* is a member of a group of species that are difficult to identify and classify. In a general sense it is probably ubiquitous.

Growing requirements

4.396. No specific requirements

Features

4.397. For this study all large and glossy leaved roses were put into the category of Dog Rose.

4.398. This species is taken to be the robust, glossy leaved rose in hedgerows that is generally a common component of many hedgerows as it it easily transported by birds and small mammals.

Species + Position [SP]

[SP][L]

4.399. Annex [A6-32] and [A1-372] shows there to be no defined pattern of position in the landscape [SP][L]. It also occurs with no particular pattern along individual hedgerows [SP][H].

Species + Abundance [SA]

[SA][L]

4.400. From Table 174.32 it can be seen that Dog Rose is, at most, Abundant and tends to be Rare to Occasional.

Species + Position + Abundance [SPA]

[SPA][L]

4.401. No apparent discernible pattern for this combination of elements

Field Rose - *Rosa arvensis*

FIELD ROSE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	5		4			2	6	1			3		21
RO													
RF													
RA													
RD													
No RARE	5		4			2	6	1			3		21
% RARE	100		100			50	50	100			60		64
OO						2	4				2		8
OF													
OA													
OD													
No OCC						2	4				2		8
% OCC						50	33				40		24
FF							2		1				3
FA													
FD													
No FREQ							2		1				3
% FREQ							17		100				9
AA		1											1
AD													
No ABUN		1											1
% ABUN		100											3
No DOM													
% DOM													
TOTAL No	5	1	4			4	12	1	1		5		33
TOT HGS	13	47	51			86	155	10	5		25		430
% TOTAL	38	2	8			5	8	10	20		20		8

Table 176.33 - Summary data for FIELD ROSE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.402. Reaches its northern limit in our county (see Figure 177.77). 0-410m (Titterstone Clee Hill, Salop).

Growing requirements

4.403. It grows on a wide variety of soils, but avoids very acidic sites, and is found on woodland edges, in clearings and along rides, on roadsides and railway embankments and in scrub and hedgerows.

Features

4.404. A deciduous shrub with weak flexuous stems which often climb over other vegetation, often forming dense patches.

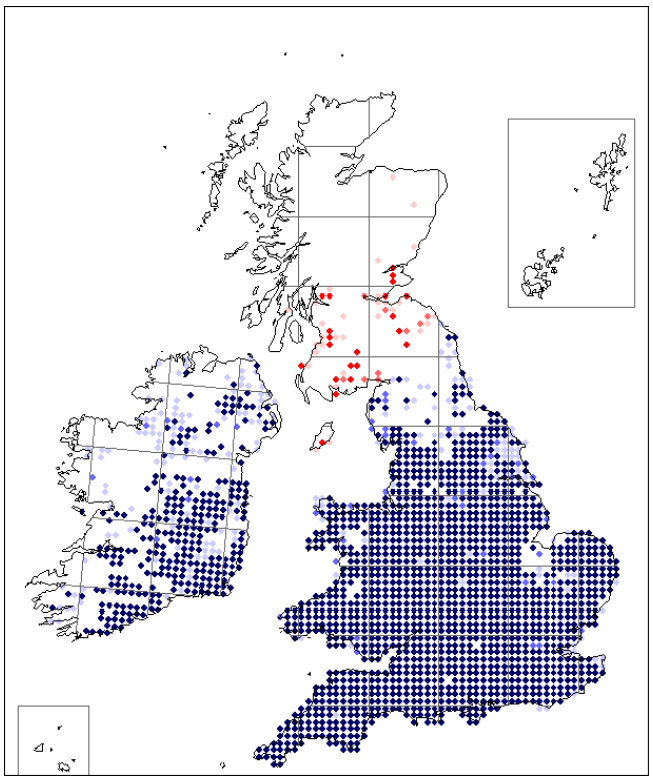

Figure 177.77 - UK distribution of Field Rose *Rosa arvensis*

4.405. It is generally regarded as a woodland species, being more often found inside woods and along woodland edges and rides. It has the potential to colonise widely as it is bird dispersed (avichorous).

Species + Position [SP]

[SP][L]

4.406. From annex [A6-31] it can be seen to occur erratically across the study area with no obvious pattern. The detailed distribution maps at [A1-392] to [A1-398] confirm this.

Species + Abundance [SA]

[SA][L]

4.407. Field Rose *Rosa arvensis* was recorded from only 33 hedgerows or 8% of the 430 surveyed. Where found it was at low density and low cover (see Table 176.33).

Species + Position + Abundance [SPA]

[SPA][L]

4.408. No combined pattern for this set of elements.

Rowan - *Sorbus aucuparia*

ROWAN													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1				1	4						6
RO													
RF													
RA													
RD													
No RARE		1				1	4						6
% RARE		100				100	100						100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		1				1	4						6
TOT HGS		47				86	155						430
% TOTAL		2				1	3						1

Table 178.34 - Summary data for ROWAN by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.409. Ubiquitous, even in upland areas, hence one of its common names of Mountain Ash. It can occur from sea level to high mountains. 0-870 m (Helvellyn, Cumberland, and in the Rannoch area, Mid Perth).

Growing requirements

4.410. A small to medium-sized tree of woods, cliffs, rock outcrops and rocky riversides. It can also be bird-sown from planted trees on waste ground and by railways. It avoids calcareous and heavy soils and dense shade.

Features

4.411. It flowers and fruits freely, and does not normally spread vegetatively.

4.412. It is not normally a hedgerow component.

Species + Position [SP]

[SP][L]

4.413. Only found on 6 hedgerows as shown on [A6-39] and [A1-399] to [A1-403]

Species + Abundance [SA]

[SA][L]

4.414. Always Rare, often only single plants and part of the hedgerow component rather than as trees.

Species + Position + Abundance [SPA]

[SPA][L]

4.415. No combined pattern for this set of elements.

Silver Birch - *Betula pendula*

SILVER BIRCH													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR					1		1	1					3
RO													
RF													
RA													
RD													
No RARE					1		1	1					3
% RARE					100		17	100					33
OO		1					3						4
OF													
OA													
OD													
No OCC		1					3						4
% OCC		100					50						44
FF							2						2
FA													
FD													
No FREQ							2						2
% FREQ							33						22
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		1			1		6	1					9
TOT HGS		47			13		155	10					430
% TOTAL		2			8		4	10					2

Table 180.35 - Summary data for SILVER BIRCH by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.416. Ubiquitous. Generally lowland, but upper altitudinal limit unknown

Growing requirements

4.417. A deciduous tree found as even-aged stands or in mixed woodland on a wide range of light, well-drained, particularly acidic soils.

Features

4.418. It can rapidly colonise open ground, particularly burned areas, and can become a threat to open heathland. It is also widely planted on roadsides and in parkland.

4.419. This species is uncommon in hedgerows normally, but can sometimes be planted as a line of trees or an avenue.

Species + Position [SP]

[SP][L]

4.420. Very few locations scattered across the study area as seen on [A6-6] and [A1-404] to [A-408].

Species + Abundance [SA]

SA][L]

4.421. Only found in 9 of the 430 hedgerows surveyed (2%).

Species + Position + Abundance [SPA]

[SPA][L]

4.422. No combined pattern for this set of elements.

Spindle - *Euonymus europaeus*

SPINDLE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR	1	1	1			1	1						5
RO													
RF													
RA													
RD													
No RARE	1	1	1			1	1						5
% RARE	100	100	100			100	100						100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No	1	1	1			1	1						5
TOT HGS	13	47	51			86	155						430
% TOTAL	8	2	2			1	1						1

Table 182.36 - Summary data for SPINDLE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.423. A species of a generally southern or lowland distribution, extending through the Vale of York on the Magnesian Limestone/and across the Yorkshire Wolds and into the limestone regions of the Southern Lakes (see Figure 183.78). 0380 m (Craig-y-Benglog, Merioneth).

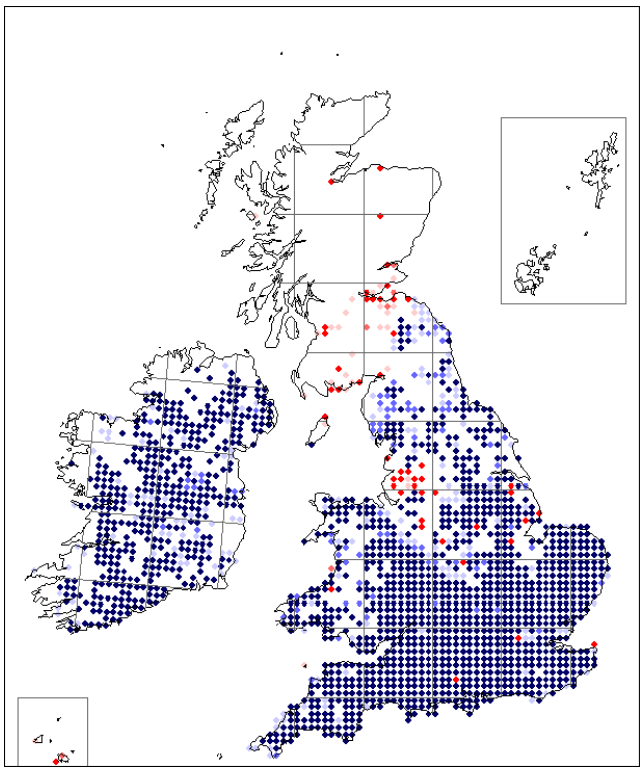

Figure 183.78 - The UK distribution of Spindle *Euonymus europaeus*

Growing requirements

4.424. A deciduous shrub or small tree found in hedges, scrub and open deciduous woodland on free-draining base-rich soils, particularly those overlying chalk and limestone.

Features

4.425. It is also planted in woodlands, hedgerows and gardens from where it can become well-naturalised in the wild.

Species + Position [SP]

[SP][L]

4.426. This is a very Rare species in the study area (four locations) at number of critical locations as seen at [A6-12] and [A1-410]-[A1-414].

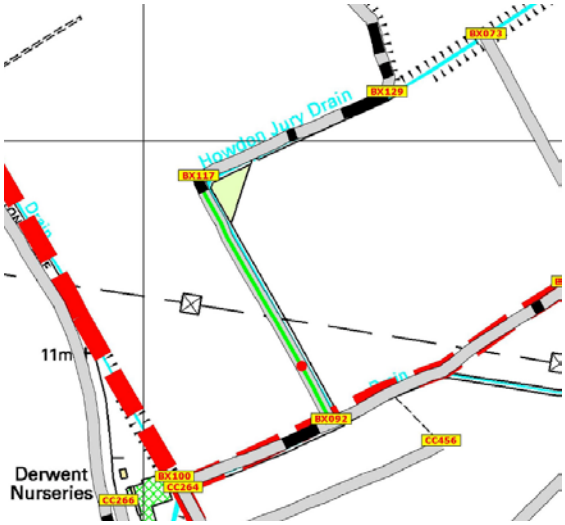

Figure 184.79 – Modern map showing the Spindle plant on hedgerow BX095-BX117.

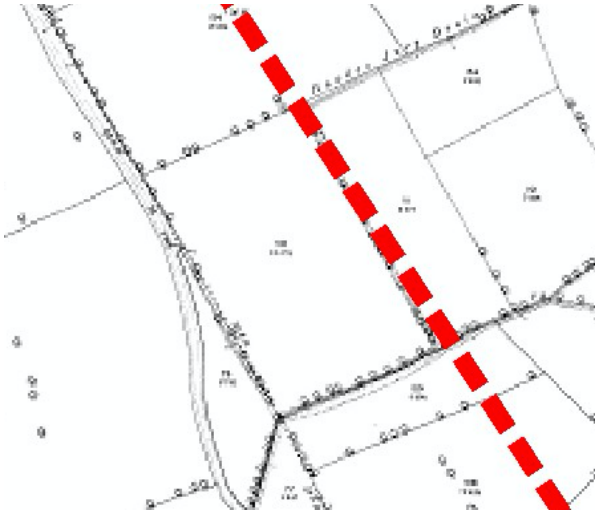

Figure 184.80 – The first edition OS map showing similar view as Figure 202.83 with the dashed line of the speculative road alignment.

Species + Abundance [SA]

[SA]L]

4.427. Rare across the landscape.

[SA][H]

4.428. Always as single or scattered plants in hedgerows.

Species + Position + Abundance [SPA]

4.429. This species has a definite [SPA] relationship. It is always at low frequency in precise locations that have known or strongly speculative historic context as is therefore a [T][SPA][L] in the landscape of Dunnington.

4.430. It occurs on township boundaries at [A1-414][BU131-BU148], [A1-412] [BW201-BW240] and on the medieval Eastfield Lane at [A1-413] [BS365-BS654]. This strongly indicates that this is a historic marker 'medieval species'. From this the other two locations need explanation.

4.431. [A1-410][CF134-CF171] is a new planting into a gappy hedgerow.

4.432. The linear hedgerow at [A1-411] [BX095-BX117] was a mystery until the 1std edition OS map was studied and there is a strong possibility that this hedgerow follows the line of an earlier alignment of Elvington Lane or was part of a coaxial field system as suggested by Barnes and Williamson (2015). It is

associated with the possible former road alignment, shown above, which is attractive as it lines up with the main road entering Murton. The current road joins the A1079 to the west .

4.433. This uses the principle that two records are documented to be on medieval hedgerows and there are no records for the species except the known recent planting and this record on hedgerow [A1-411] [BX095-BX117]. On this presumption a possible medieval or pre-medieval connection needs to be considered as follows.

4.434. The speculative road alignment suggested at Figure 131.58 shows the suspect alignment as the dashed red line to the west. This alignment is also parallel to the northern dotted line that is the speculative township boundary between Dunnington and *Ianufestorpe* leading onto Vengeance Lane north of the A166 where English Elm betrays a possible coaxial continuation from Dunnington. The coaxial evidence combined with the [T][SPA][L] and [T][SPA][H] signature of Spindle as a historic marker for medieval gives credence to the speculation.

Sycamore - *Acer pseudoplatanus*

SYCAMORE													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		8	5			7	21				6		47
RO													
RF													
RA													
RD													
No RARE		8	5			7	21				6		47
% RARE		73	36			70	72				60		57
OO		1	5			1	3	3			2		15
OF													
OA													
OD													
No OCC		1	5			1	3	3			2		15
% OCC		9	36			10	10	100			20		18
FF	1	1	2			1	4		2	1	2		14
FA													
FD													
No FREQ	1	1	2			1	4		2	1	2		14
% FREQ	100	9	14			10	14		100	100	20		17
AA		1	1			1	1						4
AD			1		1								3
No ABUN		1	2		1	1	1						7
% ABUN		9	14		100	10	3						8
No DOM													
% DOM													
TOTAL No	1	11	14		1	10	29	3	2	1	10		83
TOT HGS	13	47	51		13	86	155	10	5	7	25		430
% TOTAL	8	23	27		8	12	19	30	40	14	40		19

Table 186.37 - Summary data for SYCAMORE by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.435. Ubiquitous, but generally not regarded as native. Sycamore was introduced to Britain in the 16th century and was widely planted from the late 18th century onwards; it was first recorded from the wild in 1632. There has been little change in its distribution since the 1962 *Atlas*. 0-580 m (Dowgang Hush, Cumberland). In upland areas, however, it is often restricted to sites associated with habitation.

Growing requirements

4.436. No specific requirements.

Features

4.437. A large, rapidly growing deciduous tree of plantations, woods, parkland, estates, large gardens and roadsides, prolifically self-sowing and naturalised in a very wide range of natural, semi-natural and man-made habitats, avoiding only the most acidic and waterlogged soils.

4.438. A non-native species frequently planted as a tree and probably becomes part of the shrub component from seeding.

Species + Position [SP]

[SP][L]

4.439. There do not seem to be any patterns of the distribution of this species from the maps at [A6-1] and [A1-416]-[A1-434]

Species + Abundance [SA]

[SA][L]

4.440. Variable abundances from Rare to Abundant at the landscape level [SA][L] and also at the hedge level [SA][H]

Species + Position + Abundance [SPA

[SPA][L]

4.441. No combined pattern for this set of elements.

Snowy Mespilus - *Amelanchier lamarkii*

SNOWY MESPILUS													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR							1						1
RO													
RF													
RA													
RD													
No RARE							1						1
% RARE							100						100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No							1						1
TOT HGS							155						430
% TOTAL							1						0

Table 188.38 - Summary data for SNOWY MESPILUS by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.442. A rare introduced species that is probably a garden escape.

Growing requirements

4.443. A shrub or small tree mostly growing on acidic, usually sandy soils and naturalised in open woodland (often *Quercus* or *Betula*), wood borders and scrub, and on dry heaths and roadsides. Lowland.

Features

4.444. Introduced into cultivation in 1746, Snowy Mespilus *Amelanchier lamarkii* is widely planted for ornament, and is

considered to be the only *Amelanchier* naturalised in Britain (Schroeder, 1970). It was first recorded from the wild in 1887 (Middlesex); on the New Forest (S. Hants.) and Surrey heaths it was initially planted and is now spreading from bird-sown fruits (Brewis *et al*., 1996).

4.445. Not a species to be expected in a field hedgerow as it is a garden plant normally.

Species + Position [SL]

[SP][l]

4.446. Only one location near Prospect Farm at [A6-409][CH321-CH324] and probably an escape from the farm garden.

Species + Abundance [SA]

[SA][L]

4.447. Only one plant

Species + Position + Abundance [SPA]

[SPA][L]

4.448. No combined pattern for this set of elements.

WILLOWS

Goat Willow - *Salix caprea*

GOAT WILLOW													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR							4						4
RO													
RF													
RA													
RD													
No RARE							4						4
% RARE							80						80
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF							1						1
FA													
FD													
No FREQ							1						1
% FREQ							20						20
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No							5						5
TOT HGS							155						430
% TOTAL							3						1

Table 190.39 - Summary data for GOAT WILLOW by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.449. Ubiquitous. 0-760 m (Breadalbanes, Mid Perth).

Growing requirements

4.450. A shrub or tree which grows in open woodland and wood margins, scrub and hedgerows, and around rocky lakes and streamsides.

Features

4.451. It colonises waste ground and can tolerate drier and more base-rich soils than *S. cinerea*.

4.452. The rarer of the two medium-sized willows. As with all willows, it does better on damper soils and may have been actively encouraged in places to supply twigs for baskets and hurdles.

Species + Position [SP]

[SP][L]

4.453. General tendency to be found on Dunnington Common (hence [DU-7]) where the land would have been wetter. Often on hedgerows where there are also ditches.

Species + Abundance [SA]

[SA][L]

4.454. Usually Rare, but Frequent on one hedgerow. This is along a ditch line as shown at Figure 191.81 (see [A1-449]).

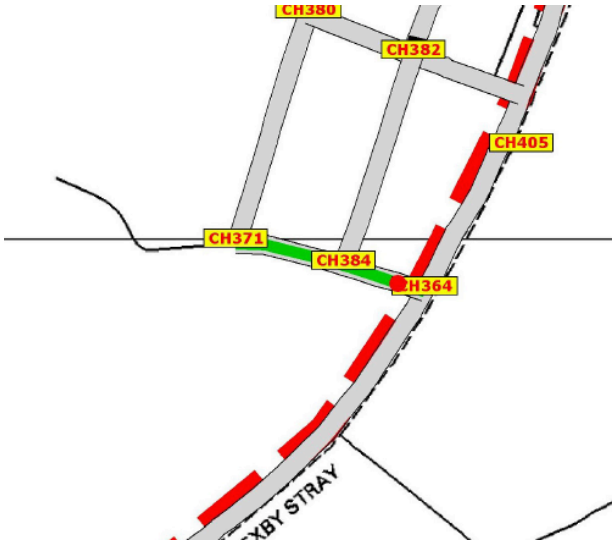

Figure 191.81 - the location where GOAT WILLOW was recorded as frequent along a ditch side.

Species + Position + Abundance [SPA]

[SPA][L]

4.455. Apart from the association of Goat Willow *Salix caprea* along the ditch highlighted above there were no particular [SPA] associations.

Grey Willow - *Salix cinerea*

GREY WILLOW													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		4		1	1	8	24	1	1				43
RO													
RF													
RA													
RD													
No RARE		4		1	1	8	24	1	1				43
% RARE		36		100	33	100	67	50	100				65
OO		4	1		2		9	1					17
OF													
OA													
OD		1											1
No OCC		5	1		2		9	1					18
% OCC		45	100		67		25	50					27
FF		1					2						3
FA													
FD													
No FREQ		1					2						3
% FREQ		9					6						5
AA							1						1
AD													
No ABUN							1						1
% ABUN							3						2
No DOM		1											1
% DOM		9											2
TOTAL No		11	1	1	3	8	36	2	1				66
TOT HGS		47	51	14	13	86	155	10	5				430
% TOTAL		23	2	7	23	9	23	20	20				15

Table 192.40 - Summary data for GREY WILLOW by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.456. Ubiquitous. Generally lowland, with an exceptional record at 845 m on Great Dun Fell (Westmorland).

Growing requirements

4.457. A shrub or small tree which grows in wet places, including woods, marshes and fens, by streams and bogs.

Features

4.458. A medium-sized willow associated with wet areas and as a colonist of damp places on waste ground and in disused mineral workings.

Species + Position [SP]

[SP][L]

4.459. From [A6-37] and [A1-435]-[A1-464] there is a general pattern of favouring the lower lying areas of Dunnington Common and the Intakes. This would place it as a species from [DU-7]. This may not be a deliberate planting but a consequence of willows being available locally, as they only occur as scattered plants with no indication of having being encouraged for their supply of twigs for baskets and hurdles.

4.460. Absent from Grimston.

Species + Abundance [SA]

[SA][L]

4.461. Usually low abundance indicating probably not regarded as a significant crop for craft use.

Species + Position + Abundance [SPA]

[SPA][L]

4.462. No apparent regular abundance in hedgerows.

Crack Willow - *Salix fragilis*

CRACK WILLOW													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR			2		1	3	2				1		9
RO		1											1
RF													
RA													
RD													
No RARE		1	2		1	3	2				1		10
% RARE		100	100		100	100	100				100		91
OO								1					1
OF													
OA													
OD													
No OCC								1					1
% OCC								100					9
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		1	2		1	3	2	1			1		11
TOT HGS		47	51		13	86	155	10			25		430
% TOTAL		2	4		8	3	1	10			4		3

Table 194.41 - Summary data for CRACK WILLOW by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.463. Ubiquitous as an introduced species mainly. 0-410 m (Allendale, S. Northumb.)

Growing requirements

4.464. A broad-crowned, often pollarded tree which grows in hedgerows, marshes, fens, wet woods and hollows, and by ponds, ditches, streams and rivers.

Features

4.465. It can tolerate a polluted atmosphere and salt-laden winds.

4.466. This species is normally a tree, but it was also found frequently in the hedge component in certain phases.

Species + Position [SP]

[SP][L]

4.467. Only occasional records scattered across the survey area

Species + Abundance [SA]

[SA][L]

4.468. Usually Rare

Species + Position + Abundance [SPA]

[SPA][L]

4.469. No obvious species, position, abundance signature.

Yew - Taxus baccata

YEW													
	DU-1	DU-2	DU-3	DU-4	DU-5	DU-6	DU-7	DU-M	GR-1	GR-3	GR-4	GR-M	TOT
RR		1											1
RO													
RF													
RA													
RD													
No RARE		1											1
% RARE		100											100
OO													
OF													
OA													
OD													
No OCC													
% OCC													
FF													
FA													
FD													
No FREQ													
% FREQ													
AA													
AD													
No ABUN													
% ABUN													
No DOM													
% DOM													
TOTAL No		1											1
TOT HGS		47											430
% TOTAL		2											0

Table 196.42 - Summary data for YEW by Site and Phase - [T][SPA][L]

Species [S]

National distribution

4.470. Almost ubiquitous. 0-470 m (Purple Mt., S. Kerry)

Growing requirements

4.471. This evergreen tree is mainly a plant of well-drained calcareous soils, but occurs locally over acidic rocks. It grows in mixed deciduous woods on limestone and also forms pure stands; ancient woods of Yew occur on the chalk in S. England.

Features

4.472. It is very widely planted in churchyards, parks and large gardens, from where it seeds freely.

4.473. Not a normal component of hedgerows and has a curious location on the township boundary.

Species + Position [SP]

[SP][L]

4.474. Only one plant on the township boundary between Dunnington and Scoreby (see [A6-41] and [A1-465][BG759-BX470]). This plant is at the point where it is apparent that a former routeway may have crossed the boundary and it could be a legacy of that event (see Figure 197.82). It may have been a marker tree at some point and is now consumed into the hedgerow.

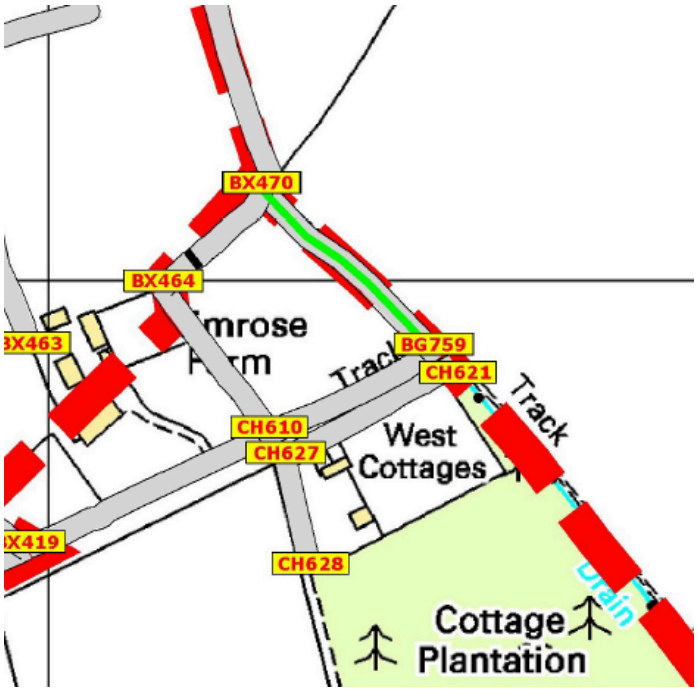

Figure 197.82 -The position of YEW on a routeway alignment crossing the Dunnington/ Scoreby township boundary.

Species + Abundance [SA]

[SA][L]

4.475. Only one plant.

Species + Position + Abundance [SPA]

[SPA][L]

4.476. It is a species at a specific position at a low abundance with no current satisfactory explanation.

Combination Analysis

4.477. The method of using combinations in the analysis is detailed at Appendix 219.2. This describes that there are two aspects to the process in that a combination of two or more historic marker species is likely to add to a confidence that a particular hedgerow is of historic significance. The other aspect considers the mix of species in a general sense to detect whether or not there is any evidence of systematic planting to a particular combination historically. This would be expected if land owners complied with recommendations or requirements from enclosure awards etc. It would be expected that if such a specification required the use of Hawthorn and Blackthorn that this combination would still be present today, at least as species in the hedgerows. The abundances may have shifted significantly over time with losses and gains through both natural and man-made actions.

4.478. The summary tables for the combination analysis are at Appendix 242.5. These show the combinations of differential species as referred to by Kent and Coker (1992). These are the species that fall between the ubiquitous and the rarities i.e., it ignores species like Hawthorn that is present in virtually every hedgerow and also species like Lilac that are probably only chance seedling escapes from a garden. Such species are likely to inform about the histories and management of hedgerows.

4.479. There are species like Crab Apple, Hazel and Field Maple that have probably been planted historically as a resource and are still present in combination today. It is also likely that these species could have colonised hedgerows over time or that they have persisted and are now present at the current combinations. Disentangling the interactions that lead to current combinations is a challenge.

4.480. At Dunnington there is an expectation that the earlier hedgerows would reflect historic species combinations and that the more recent 1709 and 1772 enclosures may have been planted to a specification.

4.481. The tables at Appendix 242.5 have selected four species to consider as differentials – Blackthorn, Crab Apple, Hazel and Field Maple. These are generally at around 50% frequency in the hedgerows of Dunnington.

4.482. Having identified these as potentials, where all four occur together this is a significant constant association. In reality, not all species will be present in a group of hedgerows

(all four species would be a desirable position). Fewer species may still be indicative as it is possible that one, or more, species may have died out or been removed. If less than 4 species are present the remaining 3, 2 or even 1 species may provide information of value. If there were three species out of the four, which three could be important e.g., is it always Blackthorn, Crab Apple, Hazel? The tables at Appendix 242.5 sort the data to reflect the various possible scenarios for combinations of 3 species, two species and also the instances where only one of the differential species is present.

4.483. To use [DU-2] as an example, there are five hedgerows where all four species are present and 10 where there are three species. Which three varies as follows:

4.483.a Blackthorn, Crab Apple, Hazel – 6 hedgerows

4.483.b Blackthorn, Crab Apple, Field Maple – one hedgerow

4.483.c Blackthorn, Hazel, Field Maple - three hedgerows

4.483.d With no hedgerows having the combination Crab Apple, Hazel, Field Maple

4.484. The object of this part of the analysis is to look for patterns in the data and these tables assist.

4.485. As a result, for Dunnington there does not seem to be any systematic planting mixes adopted for either of the enclosure planting periods. [DU-6] and [DU-7] have characteristic combinations but the expectation that they might all be essentially Hawthorn/ Blackthorn is not the case. For both there is a high incidence of Crab Apple (58%) and Hazel (58%) in the mixes. Both of these are unlikely to have colonised to such extents in just over 200 years. They are more likely to have been included in the original planting.

4.486. For [DU-7] Crab Apple is still at (59%), but Hazel is less favoured at [25%). Also at [DU-7] there is a distinct lack of Field Maple in the mix, 8% compared with the 59% in [DU-6]. Making Field Maple a species that possibly should not be regarded as a differential.

4.487. There were no obvious patterns to explain why the rarer historic marker species were not associated with particular combinations. However, the data from [DU-2] shows that all of the hedgerows with all four differentials also had at least one historic marker 1st decile species on them. There is also a tendency for hedgerows with historic marker species on them to be more species-rich and have more differentials on them.

Trees

4.488. The presence of trees within hedgerows was clearly important to our predecessors. Exactly why they were planted and how they were used is somewhat unclear and will form part of further research. This significance is emphasised by agricultural writers of the day detailing accounts of hedgerow creation in the adjacent township of *Scoreby*. A reference by Mr Marshall (Unknown date but 18c) quotes:

4.489. 'In some instances the ground has been trenched with the spade to the depth of eighteen inches, previously to planting the quickwood; nine or ten roots are planted in a yard, with commonly an oak in every 7 yards'.

4.490. Such accounts of agricultural practice are invaluable in disentangling the palimpsest of hedgerow creation and management. This simple statement confirms that, at that time, in the township of *Scoreby* the practice was to plant essentially single species hedgerows with a high density of oaks. Charles Howard (Howard 1832) also alludes to the fact that in some of the earlier 'fences' there was

4.491. 'a considerable quantity of Blackthorn, Hazel, Wild Rose etc'.

4.492. This is corroborating evidence that older hedges tended to contain these species and were generally more species rich.

4.493. Regarding the statement about planting an oak tree every 7 yards this can be further investigated at Dunnington. The 1st ed. 25 inch OS map shows considerably greater numbers of trees than are currently found within the landscape. Looking at a small section of the two medieval townships confirms this. On the 1st ed. OS maps there are over 3000 trees marked within the two townships. The current survey conducted for this report recorded 931 trees extant and of sufficient size to regard as being trees. Many of these can be reasonably accurately traced to those marked on the first edition OS maps as can be seen at Figure 202.83 and Figure 202.84. These also show the closely spaced trees along some of the hedgerows that are approximately 7m (yds) apart.

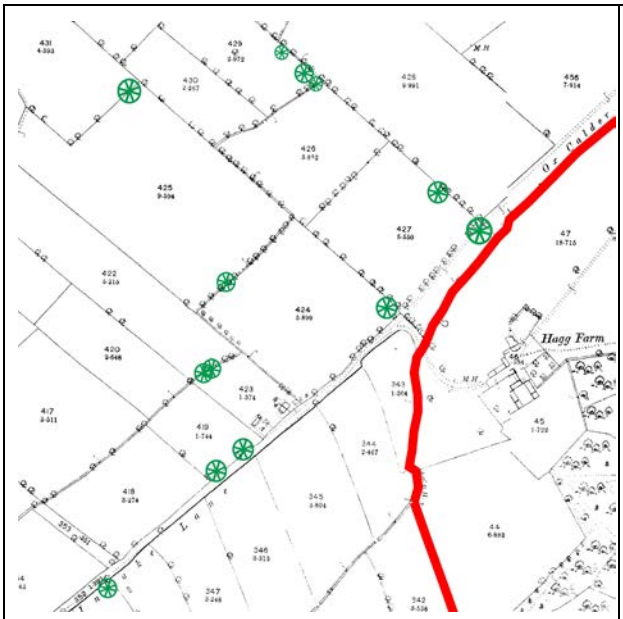

Figure 202.83 – A section of Dunnington on Intake Lane showing the extant Ash trees (green and scaled for trunk diameter) and the 1909 stock as shown by the black tree symbols.

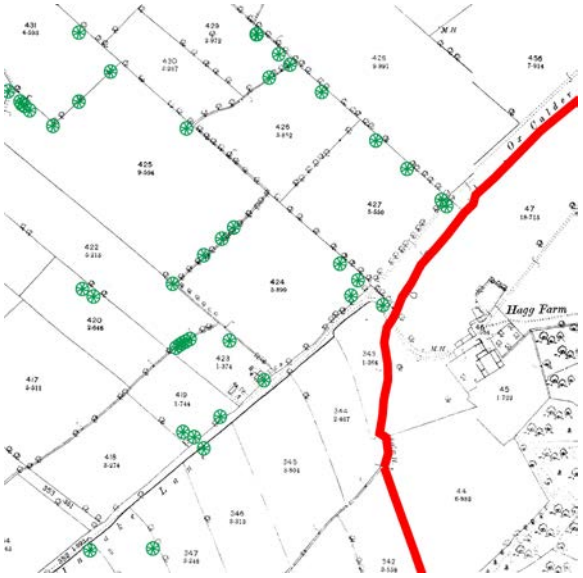

Figure 202.84 – A section of Dunnington on Intake Lane showing the extant Ash and Pedunculate Oak trees combined (green and un-scaled by trunk diameter) and the 1909 stock as shown by the black tree symbols.

4.494. The 3000 trees recorded on the 1st ed. 25 inch OS maps include both those that were in hedgerows and also those that stood alone. Looking at the extract on Figure 203.85 it can be seen that there is a line of trees running through the middle of a field which, even in 1909 (when the map was drawn) indicates that this is the former line of a hedgerow where the shrubs forming the boundary have been removed prior to that date. It is often possible, even within a modern landscape, to be able to detect former hedged field boundaries by looking for lines of trees running across arable or grass fields. In realistic terms, observing a single tree is unlikely to confirm a former boundary unless it can be linked to a mapped boundary from the 1st ed. 25 inch OS maps. Finding two trees may indicate a field boundary, but finding three trees in a line gives more conclusive evidence that this was at one time a hedged field boundary with hedgerow trees. This again may be confirmed by consulting the first edition OS maps.

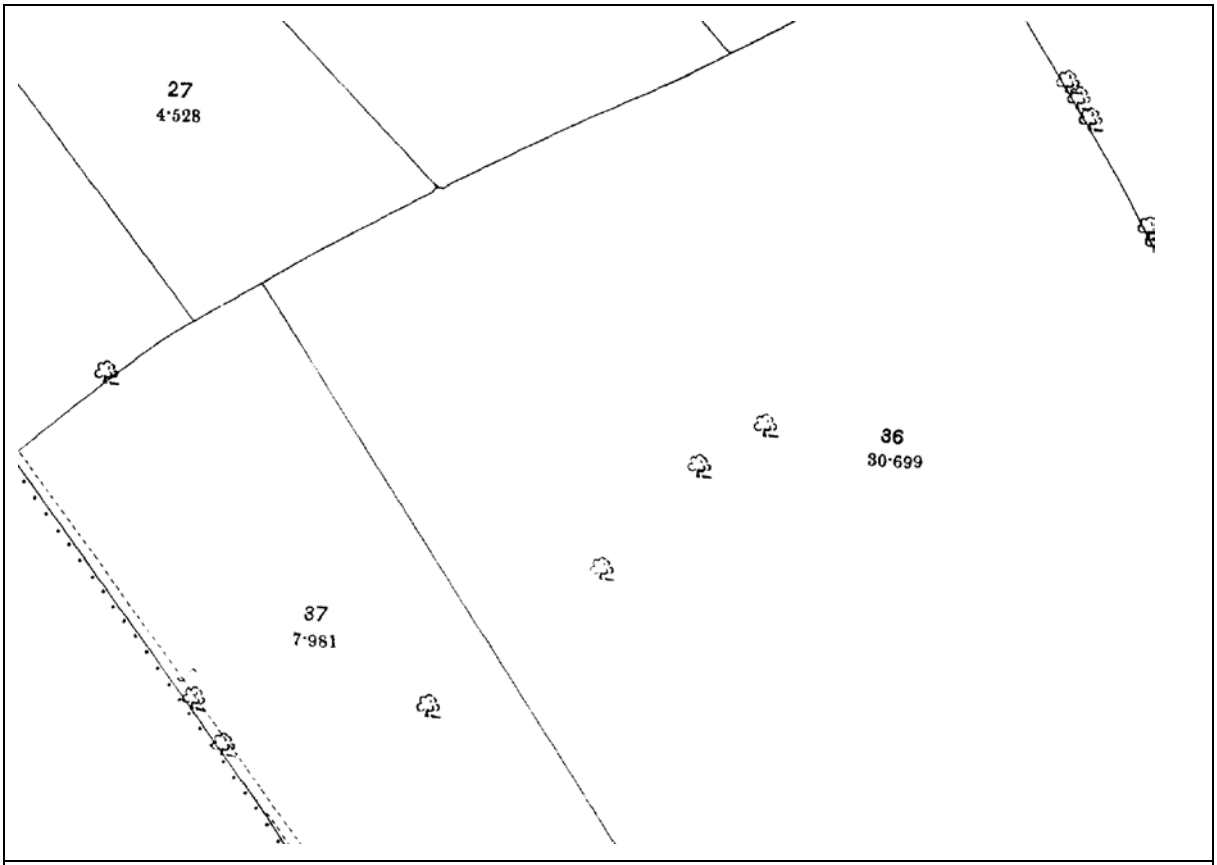

Figure 203.85 - Section near Grimston showing that even in 1909 there were traces where former hedgerows had been removed, leaving a line of trees to betray its alignment.

4.495. Some of the trees are notable for their age. The majority of oak and ash trees show a considerable range in ages. In general, the older specimens corroborate the assumption that the hedgerow plantings are approximately 200 years old. Using a general rule of thumb, under good conditions, an oak tree will achieve a trunk diameter of approximately 1m in approximately 180 to 200 years. Although the data has yet to be analysed more critically at present, the general impression is that there are relatively few trees exceeding that diameter and that probably those that do can be assigned to hedges that pre-date the enclosure awards of 1709 and 1772.

4.496. The diameter may be the only means at the observer's disposal to estimate the age, but this can be misleading. A recent unfortunate incident near Cowthorpe provided the opportunity to count the rings of three Pedunculate Oak trees in a roadside hedgerow. The diameters were 85cm, 1.3m and 1.6m. It would be understandable to suggest the first was probably much younger than the second two, but, with very careful measurement it transpired that the ages of the three

were 205 years, 209 years and 228 years. Basically, allowing for error in counting, they were all probably planted at the same time, approximately 210 years ago. The first tree showed very little growth in the last 50years, with the annual rings being less than 1mm i.e., 7.5mm in 10 years.

4.497. As a general rule hedgerow trees in a given hedgerow section should be regarded as being of similar age if they have similar diameters, but this example serves as a cautionary note to indicate that growth rates can vary very significantly.

4.498. Also of concern was the age estimate applied to these trees before they were cut down. A calibration curve derived from the age estimation work of John White (1998) gave a suggested age for the largest specimen of 330 years, 230 years for the middle-sized tree and 120 years for the smallest.

4.499. The summary data for the trees surveyed is at Table 204.43

Table 204.43 - Summary table for the trees recorded during the surveys

Species	Number recorded	Min Diameter (cm)	Max diameter (cm)	Ave diameter (cm)
Field Maple	20	20	80	34
Sycamore	95	5	130	45
Horse Chestnut	14	25	90	48
Alder	45	10	110	43
Silver Birch	2	40	123	82
Sweet Chestnut	3	50	90	67
Hawthorn	20	30	40	31
Beech	13	30	60	48
Ash	207	10	155	57
Holly	19	20	50	29
Apple	2	30	40	35
Crab Apple	16	20	30	27
Scots Pine	1	30	30	30
Damson	1	30	30	30
Cherry	7	25	50	32
Pear	4	30	30	30
Pedunculate Oak	424	10	160	68
Crack Willow	17	30	240	77
Stump	7	50	90	79
Lime	7	20	80	44
English Elm	9	30	90	52

4.500. These data show that Pedunculate Oak was by far the most abundant tree species in the study area. 424 specimens were identified ranging from saplings to specimens with trunk diameters of 160cm. The next most abundant species was Ash

with 207 specimens recorded. A number of other species were recorded as trees in hedgerows, including Sycamore, Field Maple Horse Chestnut and Alder. The general nature of trees in the study area was that they were relatively young indicating that many probably dated from one or both of the enclosure periods. However, there were a number of trees that were in the older mediaeval boundaries. There does not appear to be any pattern to their distribution other than, as has already been mentioned, the occurrence of specimens at approximately 7m spacing in accordance with the presumed planting distance in the 18th century.

Willow - Crack

4.501. There was a notable Crack Willow *Salix fragilis* tree on the boundary between Kexby and Dunnington Common. This tree was a very ancient specimen that had been pollarded in the very distant past and was a significant size having a diameter of 1.86m. According to research by arboriculturalists the maximum predicted diameter of a Crack Willow tree would be 1.11m. The specimen at Kexby was significantly bigger than this. It was a pollard set on the Dunnington Common side of a large shallow ditch. Assuming that Crack Willow grows at approximately the same rate as an Oak tree the specimen at the Dunnington Common/ Kexby boundary would have been at least 450 years old.

4.502. The indication is that this is a significant boundary tree that has been preserved through time. It was in a severe state of decline as the photograph (Figure 206.86) shows, having lost a major limb in relatively recent years, but it was still a magnificent specimen in 2010. The precise grid reference is SE-68139-50773 (468139-450773). This was approximately 600m south of *Scoreby* Lodge off the A1079 along the bridleway that runs along the township boundaries. This boundary also contains a plant of Purging Buckthorn that is a further indicator of the age of this feature.

Figure 206.86 – The, now lost, ancient pollarded Crack Willow on the Dunnington/Kexby boundary showing the 'Tilley' hat for scale, which is 30cm in diameter (taken in May 2010).

Oak and Ash

4.503. Another aspect of our inherited tree population is that, according to a local farmer in *Scoreby* township, there is

variation in susceptibility of tree species to lightning strike. This has been corroborated by discussion with an expert on lighting strikes and trees and confirms that Ash is more prone to being struck by lightning than Oak. On this basis it is likely that, over time, the loss of Ash trees will be greater than that of Oak trees and that this will shift the balance between the two species, with a larger number of Oak trees surviving. This may be evidenced in the different number of the two species recorded, but could also be because fewer Ash were planted historically.

4.504. Although the 1st edition OS maps show individual trees, there is no indication about the species or size, unless these are in the surveyor's notebooks.

5. Discussion

General

5.2. The survey and analysis approaches for this study have revealed a number of unrecognised characteristics of the hedgerows at Dunnington and Grimston. The study has confirmed, and speculated on, the undocumented townships postulated by Stephen Moorhouse.

5.3. The survey method developed during this study is appropriate and has proved sufficient detail to allow for rigorous analysis. Although a Level 3 survey was done on Intake Lane, the extra level of detail was not essential to collect. Level 2 surveys are sufficient, certainly for recognisance surveys, providing they accurately record all species (and don't miss some of the critical and rare species), their abundance and the precise GPS location of the 1st decile species.

Dunnington

5.1. The history of Dunnington charts changes in the area of land enclosed by hedgerows through time. The chronology posed by Stephen Moorhouse has been supported by the botanical data. However, there are locations where the botany needs explanation. The study has identified that certain shrub species are historic markers in the landscape and where they occur on features of known antiquity, as determined by Stephen Moohouse's work, there is confirmation. However, where there are historic marker species but Stephen has not indicated a corresponding medieval or Tudor boundary, there is a question about what the species is telling us. It is speculated that in some cases the species is indicating an undocumented boundary, either one that was potentially present before the medieval period, or one that indicated a former road or coaxial hedgerow alignment.

5.2. Looking for patterns of species combinations for the different phases has produced a result of some value, but has not revealed any systematic planting for the Dunnington enclosures or at Grimston.

5.3. English Elm has turned out to be a significant species. It marks out medieval boundaries, but also occurs on other boundaries that are located where postulated explanations can be drawn. Some indicate a possible pre-medieval coaxial field

system as they follow a grain across the moraine of Dunnington running NW-SE.

5.4. This species is unusual in its abundances. Often it dominates the hedgerow. This is a characteristic of the species as it suckers regularly and aggressively. But equally it can be found as single plants. As these are on critical boundaries, even such low abundances are taken as assisting with the historic interpretation.

Grimston

5.5. Unfortunately, the majority of hedgerows within Grimston Township have been removed since they were created. The evidence presented by Stephen Moorhouse indicates that there were several hedgerow creation eras within this township, the earliest being the township boundaries that are dated to the medieval period. Also within this era some of the internal field boundaries would also have been created. Subsequent to this the landscape was enclosed some time before 1740, given by Stephen Moorhouse as the latest date for the map.

5.6. The presumed ancient hedgerows on the medieval township boundaries have species groupings that generally indicate their historic origins. There are three surviving fragments on the western boundary these are:

5.6.a [A4-2][CC002-CC020]. Three important species occur along this length of hedgerow, these are Guelder-rose [A1-248], Crab Apple [A1-38] and Hazel [A1-261]. In particular, the Guelder-rose and Crab Apple are of significance. These both occur at the southern end of this hedgerow. This may be an association with the medieval internal boundary that would have run eastwards from [CC020]. This is an example of grouping within a hedgerow [SPC][H] as well as species-location in the landscape [SP][L].

5.6.b [A4-1][CE190-CE202]. This is a relatively species-poor hedgerow possibly indicating replanting in the past, probably during the enclosure period to refurbish a hedgerow that may have been in decline previously.

5.6.c [A4-3][CE288-CE311]. Although this hedgerow lacks Guelder-rose it does contain Hazel as well as some Blackthorn. This level of species-richness indicates that this hedgerow is potentially of some age.

5.7. The southern boundary of the township has a single hedgerow extant. This is [A4-7][CE684-CE687]. Unfortunately it is a severely degraded hedgerow and contains little of value in terms of interpreting its origin.

5.8. The northern boundary fragment bordering the A166 at [A4-5][BV229-BV245] is relatively species-poor indicating that it has probably been realigned or replanted during the history of the A166.

5.9. The same applies for the fragment bordering the western side of Bore Tree Baulk [A4-5][BV230-BC279] and [BV231-BV258].

5.10. The pair of hedgerows that run along Elvington Lane through what was formerly the medieval Township are variable in character. These are all shown on [A4-5]. At the northern end, on the eastern side of the lane the hedgerow [A4-5][CC330-CC336] is relatively species-poor and also contains some Privet, indicating a potential domestic escape.

5.11. The entire length of the western hedgerow [A4-5][CC310-CC329] is also relatively species-poor, but does contain some Sycamore and Blackthorn.

5.12. At the southern end of the lane where it turns and runs southwest-northeast there are two significant paired hedgerows. These are [A4-5][CC394-CC310] and [A4-5][CC337-CC355]. These are matched by both containing Field Maple, Sycamore, Hazel, Crab Apple and Blackthorn. Bearing in mind that hedgerow [A4-5][CC337-CC355] could potentially have been two separate hedgerows, as the section surveyed turns through 90°, it is interesting to note that the locations of the Field Maple were only on the southwest-northeast section [A1-220]. This elevated species-richness indicates that this southern pair of hedgerows has had a different history from those that run through the medieval Township site southeast-northwest. The implication is that this pair is of greater antiquity in terms of the species they have retained/ acquired.

5.13. By contrast, the other hedgerows running southeast-northwest have characteristics suggesting that they may have been modified or re-planted since their original planting if the entire section of Elvington Lane was indeed planted with hedgerows at the same time. Otherwise, the southern and northern pair may have been originally planted at different times.

6. Further research

6.1. The survey highlighted a number of issues to address, in particular the status of apples and Damson.

Apples

6.2. The surveys revealed that there were two types of apple in the hedgerows. Crab apple as expected, but also a larger than expected number of sweet Domestic Apples. It is proposed to revisit these to determine how many of the 'apples' were Crab Apple and how many were Domestic Apples. This may provide an insight into the way the landscape hedgerows were managed by our ancestors and how the hedgerows were used by them.

Damson/ Blackthorn

6.3. The incidence of Damson was probably not accurately documented as it is difficult to separate it from a broad-leaved example of Blackthorn. Ideally surveys should be done during the fruiting period. Although with hedgerow management and cutting, there may be no fruits set or visible at the time of survey anyway.

6.4. Another extension for using the current data would be to correlate the botanical evidence with the land ownerships from the Tithe maps. These may shed light onto the reasons why certain hedgerows have the range of species they have, i.e. did a particular owner plant a specific mix in the hedgerows he controlled at that time?

7. Appendices

Appendix 212.1 - The SSACFOR scoring system

7.1. One of the key elements of recording that is generally lacking is a consistent method for applying abundance values to species in a simple and understandable manner. Kirby[10] (1988) on page 33 highlights an issue regarding the DAFOR[11] (see Kent and Coker 1992) scale (Dominant, Abundant, Frequent, Occasional, Rare) in that:

- 'These terms have no precise definition and observers vary in their use; both frequency and cover are combined (or confounded) in the one value and plant size and season affect the result'

7.2. As Kirby states the words used relate to both frequency and to cover or abundance. Frequency refers to the distribution and number of plants (or in some cases leaves or shoots for vegetative rhizomatous species like Wood Anemone *Anemone nemorosa* or Bracken *Pteridium aquilinum).*

7.3. One alternative system is the ACFOR (see Kent and Coker[11] 1992) (Abundant, Common, Frequent, Occasional, Rare). This avoid the Dominant class that is intended to indicate ubiquitous frequency and extremely abundant cover or presence.

7.4. A general perception of the DAFOR system is:

- Dominant = Cover, abundance measure - the species is ubiquitous in terms of both the number of plants or leaves etc., and is the most visually abundant species in terms of its cover/ presence.
- Abundant = Cover, abundance and/ or Frequency measure - Many plants leaves etc, and occupying a significant amount of the ground or showing a significant presence.
- Frequent = Frequency measure - Moderate numbers of plants, spaced out and not covering large areas or having a significant presence.
- Occasional = Frequency measure - A few scattered plants with low total cover/ presence.

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[10] KIRBY, K. J. (1988). *A woodland survey handbook*, NCC, Peterborough.
[11] KENT, M. and COKER, P. (1992). Vegetation description and analysis - a practical approach. John Wiley & sons. Chichester.

- Rare = Frequency measure - Very few plants and very low cover/ presence.

7.5. Added to these descriptions A**C**FOR includes:

- Common - Frequency measure - between frequent and abundant.

7.6. Sometimes lists are produced from surveys where the abundance is given as O-lc indicating Occasional and locally common (both frequencies). Does this mean there are say 20 places where the species occurs and it is locally common at each or it is only locally common at some, or one? 'O-lc' is more helpful than 'O', but 'locally common' implies frequency. The adoption of this refinement is inconsistently applied and only where the local frequency/ abundance differs from the general level.

7.7. The DAFOR approach sometimes adopts an assessment of the percentage 'cover' for each scale point. One of the more widely accepted for DAFOR is to convert the Braun-Blanquet (Braun-Blanquet[12] 1964) scale of 1-5 into the five letters (from Kent and Coker 1992);

- 76-100% - Dominant
- 51-75% - Abundant
- 26-50% - Frequent
- 6-25% - Occasional
- 1-5% - Rare

7.8. There are others in literature that use different cut-off points for the percentage band.

7.9. An alternative adopted by this research is a modification of DAFOR that used two DAFOR codes one assessing frequency and one assessing local cover abundance. This is referred to as double DAFOR or DDAFOR. Thus a species was considered for the number of times a bush was found and given a DAFOR code. Then, if the local abundance was greater the second letter was an elevated DAFOR given to reflect the dominance of the species at the places where it occurred. A species that was infrequently found like Holly *Ilex aquifolium* was very often a dominant component and was coded OD or FD.

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[12] BRAUN-BLANQUET, J. (1964): Pflanzensoziologie, Grundzüge der Vegetationskunde. (3. Auflage). Springer Verlag, Wien, 865 pages.

7.10. This is now refined into a form of SACFOR (Hiscock[13] 1990), called double SACFOR or SSACFOR which is described here as the future for abundance coding. In relation to the data presented here, the only two codes that differ between DDAFOR and SSACFOR are that this research used the DAFOR code [D] and the new code will be [A], whereas the DAFOR code [A] is now the SSACFOR code [C].

7.11. This method is used in marine ecology encompassing a percentage cover estimate and frequency density of species such as limpets on littoral rocks in a single code (see Figure 215.87). SSACFOR uses two codes, considering frequency/ density and cover/ abundance using a SACFOR letter for the frequency element and a number derived from the SACFOR codes for the cover/ abundance element. The letters account for frequency – how many plants, patches or occurrences and the numbers assess the cover/ abundance – how much there is at each location. It also applies a density that takes account of the sizes of the organisms being assessed i.e., the numbers/10cm^2 of small limpets will potentially be more dense than the density of larger ones. For small limpets <1cm super-abundance would be >80% cover and a density of >10,000/m^2, but for limpets 3-5cm the density of animals regarded as superabundant would be 100-999/m^2.

[13] HISCOCK, K. (1990). Marine Nature Conservation Review: methods. Joint Nature Conservation Committee, Peterborough, Nature Conservancy Council, CSD Report, No. 1072. (Marine Nature Conservation Review Report, No. MNCR/OR/5.).

Figure 215.87 - Synopsis of the SACFOR coding system for marine surveys								
Growth form	Size of individuals/ colonies							
% cover	Crust/ meadow	Massive/ Turf	<1cm	1-3 cm	3-15 cm	>15 cm	Density	
>80%	S		S				>1/0.001m^2 (1 x 1 cm)	>10,000/m^2
40-79%	A	S	A	S			1-9/0.001m^2 (3.16 x 3.16cm)	1000-9999/m^2
20-39%	C	A	C	A	S		1-9/0.01 m^2 (10 x 10 cm)	100-999/m^2
10-19%	F	C	F	C	A	S	1-9/0.1 m^2 (31.6 x 31.6cm)	10-99/m^2
5-9%	O	F	O	F	C	A	1-9/m^2	
1-5% or density	R	O	R	O	F	C	1-9/10m^2 (3.16 x 3.16 m)	
<1% or density		R		R	O	F	1-9/100 m^2 (10 x 10 m)	
					R	O	1-9/1000 m^2 (31.6 x 31.6 m)	
						R	<1/1000 m^2 (31.6 x 31.6 m)	

7.12. This equates with HEDGES in the consideration of the frequency or density of shrubs.

7.13. In hedgerows, a species might be only scattered plants - DAFOR/ SACFOR Occasional or O - along a hedge, but where it occurs it may be obvious and occupy a long section of hedgerow - Braun-Blanquet 4 or 5. Using SSACFOR this would be coded O-4 or O-5 to signify Occasional plants - locally high or very high % cover.

7.14. This system uses all combinations of R-1 to A-5. Illustrations at Figure 217.88 and Figure 218.89 show examples of species recorded in both area and linear habitats. The Superabundant category is reserved for cases where the species is unmistakably the primary species along the hedgerow and there is no separation between large numbers of plants and large cover or presence.

7.15. The example of A-1 would be where a species is common along a hedgerow length, but is only present as individual sprigs or is only single plants at each location (the SSACFOR system also interprets the linear feature frequency in terms of how far it might be between plants for both shrubs and ground flora).

7.16. The diagrams at Figure 217.88 and Figure 218.89 show that a pattern can exist in nature where a species is found

almost ubiquitously across the woodland floor, or along a length of hedgerow but only as individual plants or sprigs of woody growth. In reality, both in woods and along hedgerows, there will be many species that fit this pattern. In a hedgerow, Bramble *Rubus fruticosus* can range from O-1 or O-2 to being present every metre or so, but only as small sprigs, when it would be coded C-1 or A1.

7.17. By recording the frequency/ abundance in this way a more comprehensive indication of the species presence is obtained. Recording Holly *Ilex aquifolium* as SSACFOR O-6 (Occasional and >80% presence) in a hedge is more informative than recording it as DAFOR 'O' and considerably more valuable than just recording it as present, which would be all that is required by other survey methods (Pollard[14] 1974, Defra[15] 2006).

7.18. For either area features or linear features there may be larger patches or longer continuous lengths of some species. These may require a field note. In a woodland it would be preferable to make separate lists for areas where a species has clearly different abundances, e.g., one list where Bluebell may be dominant and another for an area where it is less dominant and intermixed with other species. Such clumping may by biologically relevant. For example Herb Paris *Paris quadrifolia* often occurs in shallow damp calcareous depressions in woods. These colonies could either be coded as R-3 taking the sample area as the wood, or F-3 if recording the area with Herb Paris as a sub-plot.

[14] POLLARD, E., HOOPER, M. D. and MOORE, N. W. (1974). *Hedges*. London, Collins.
[15] DEFRA., (2007). *Hedgerow survey handbook,* Second edition, Defra, London.

Figure 217.88 - Diagram illustrating the SACFOR interpretations for area habitats.

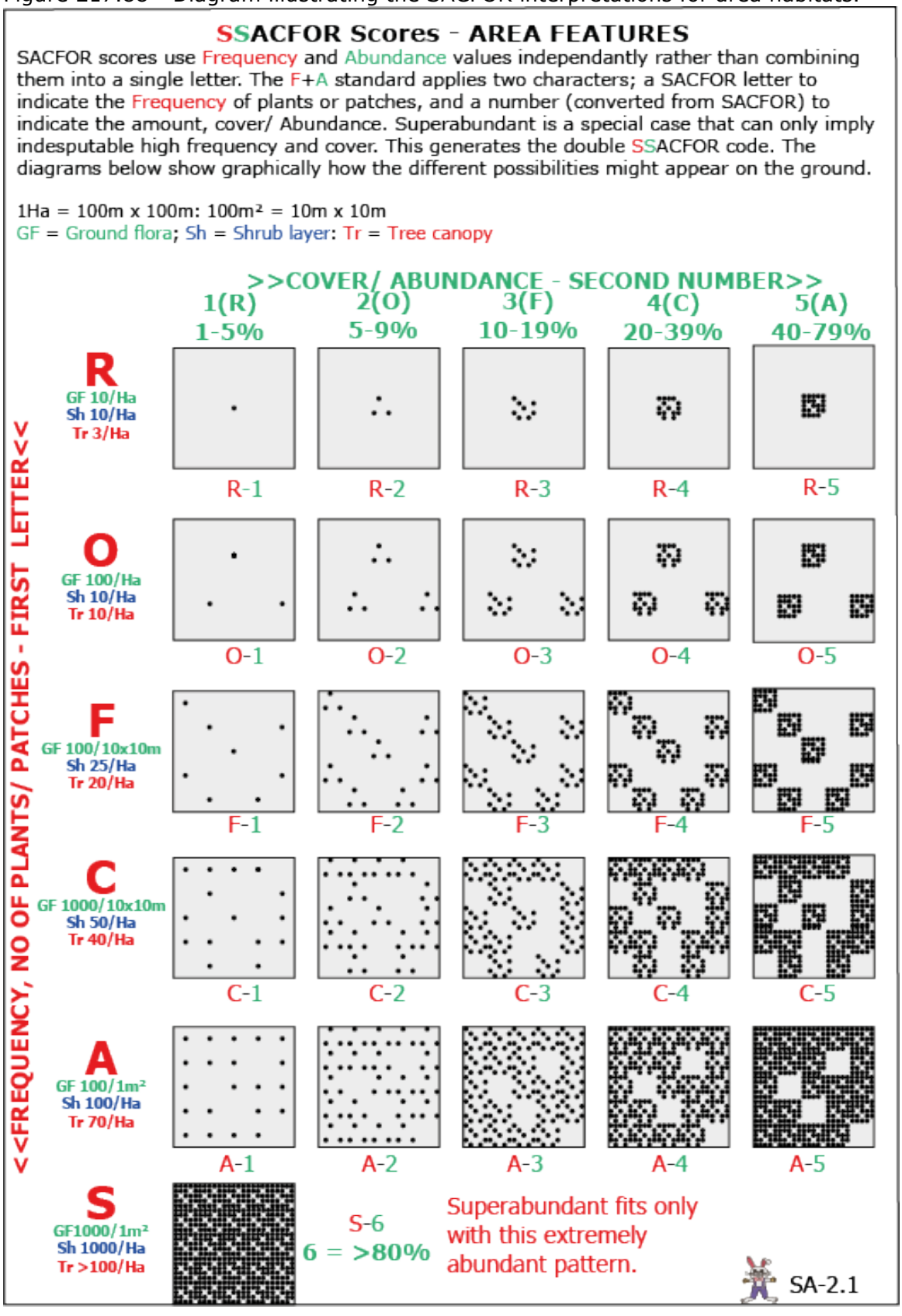
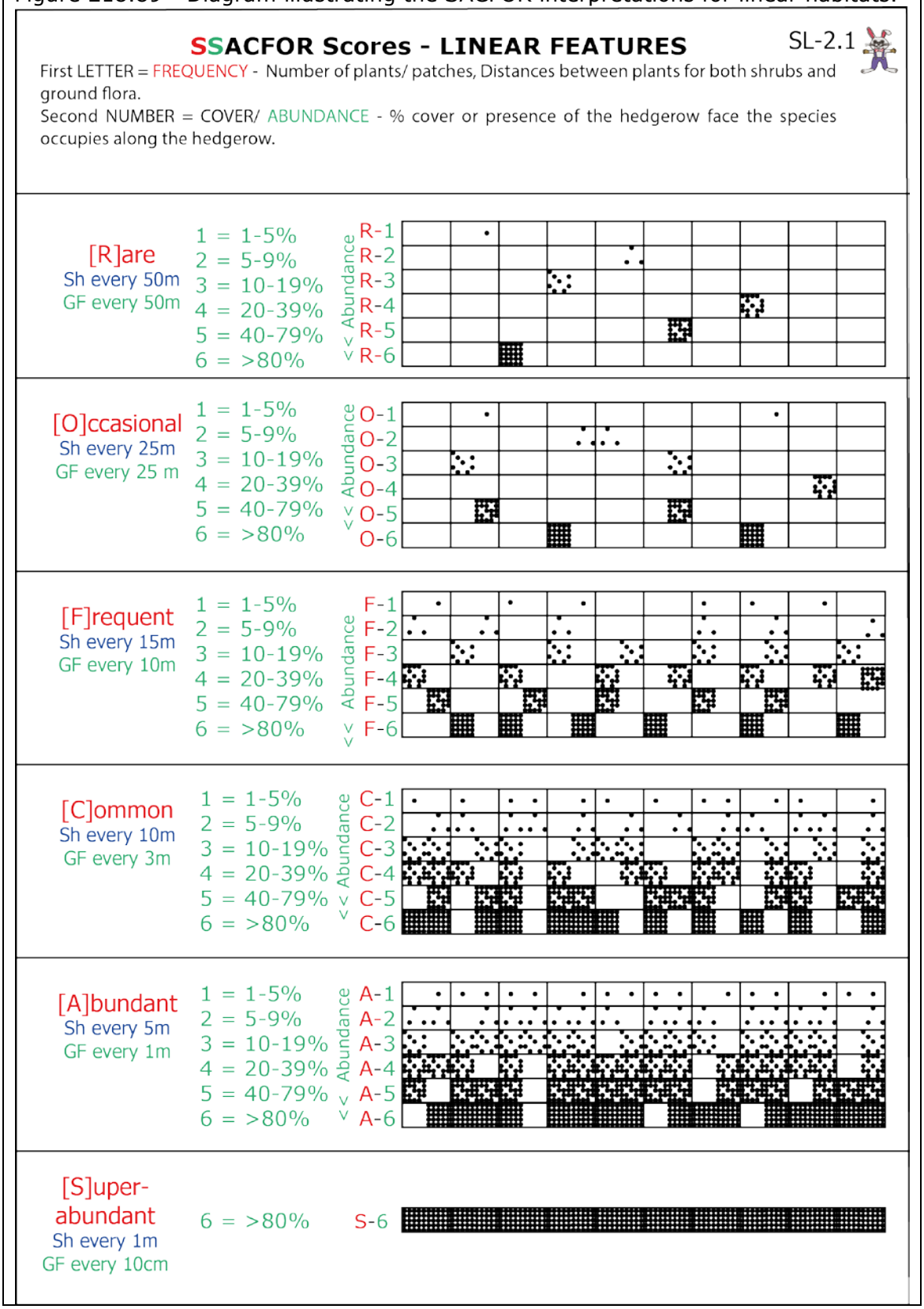


Figure 218.89 - Diagram illustrating the SACFOR interpretations for linear habitats.



Appendix 219.2 - SPACES analysis method

7.19. The woodland and hedgerow survey and analysis methods have evolved together with the analysis, developing into a novel method of SPACES (**[S]**pecies, **[P]**osition, **[A]**bundance and **[C]**ombination **E**valuation **S**ystem) analysis. It is applicable to both hedgerows and woodlands. This is a novel approach that contributes to academic understanding by providing an intelligent systematic method for assessing and interpreting botanical indicators as historic markers. It considers the 'spaces' that species occupy at the landscape and local level (woodland or hedgerow) and also the species combinations. Considering these elements will indicate where there are patterns that explain history and pose questions for investigation to determine the reasons for the observations.

7.20. The SPACES approach works for both woodlands and hedgerows at all scales from individual woods or wood fragments to woods at the landscape scale. Similarly from parts of hedgerows through whole hedgerow lengths and whole hedgerows in the landscape. It also accounts for woods and hedgerows of different lengths, and, for woodlands, for different levels of survey effort. It doesn't require a fixed number of quadrats, a defined transect pattern or a set survey time. It uses any and all information available. If more information is needed and collected this adds to the confidence of the interpretation.

7.21. The system looks at the four core elements of [S]pecies, [P]osition, [A]bundance and [C]ombination to interpret the significance of the botanical content of woodlands and hedgerows.

7.22. In addition SPACES considers [T]ime and [M]anagement as well as scale; [L]andscape, [H]edgerow and [W]ood.

7.23. **Species [S]:** what can the species inform about the historic origins of individual hedgerows and about the overall history of the landscape in combination with the other elements? The species [S] may be present in the study area as a result of historic planting, in which case it will be found on specific hedgerows [SP][L] associated with time and will therefore have the SPACES signature of [T][SP][L]. Also a species may be typical of wet areas in the landscape regardless of historic planting and would therefore be [SP][L].

7.24. **Position [P]:** where are individual species located both within the landscape and within habitats?

Abundance [A]: how abundant are species within the landscape and within individual features? Abundance incorporates the elements of frequency or density as well as the cover or amount of species (see Appendix 212.1).

7.25. **Combination [C]:** How are species grouped in the habitats? The species and combination elements can each be combined with the position and abundance elements to create seven combinations. Patterns can be investigated by considering the combined elements. Combination is used rather than community to reflect the anthropogenic influences and nature of woods and hedgerows. Although natural colonisations and extinctions can occur in hedgerows, the combination of species present today is not natural as it reflects the needs of our ancestors who created, modified and managed these features. Therefore community is inappropriate. It is inappropriate in woodlands where past management has a significant influence on the current combinations in areas such as charcoal hearths or along earthworks.

7.26. **Time [T] -** A purpose of hedgerow and woodland surveys is to analyse the species present today using SPACES to indicate ecological and management history. This requires the consideration of time in the analysis. This indication may be evident from considering particular elements from SPACES. An example from a hedgerow would be Purging Buckthorn *Rhamnus cathartica* that is a [S]pecies that is nearly always at specific [P]ositions [SP], on township boundaries, at low [A]bundance [SA], associated with other species [C]ombinations [SC] (with Spindle *Euonymus europaeus* and Guelder-rose *Viburnum opulus*). This would be classed as a [SPAC] species indicating it encompasses [SP], [SA] and [SC] that combine to [SPAC]. The SPACES status of a species normally uses the greatest number of elements that can be combined (see the hierarchy at Figure 222.91). Having determined that the species is indicative of medieval origins and that the associations are at the landscape level this species this would add the [T] prefix and [L] suffix - [T][SPAC][L].

7.27. **Management [M] -** If the species was indicating management a further prefix would be added [TM][SPAC][L] (see Figure 221.90). This would be relevant if a set of hedgerows were found to have been laid in the past or coppiced etc, or if a woodland had been coppiced.

7.28. Many combinations of the elements are possible and can be used to interpret the data. A diagram at Figure 221.90

illustrates these and the text that follows describes the combination scenarios.

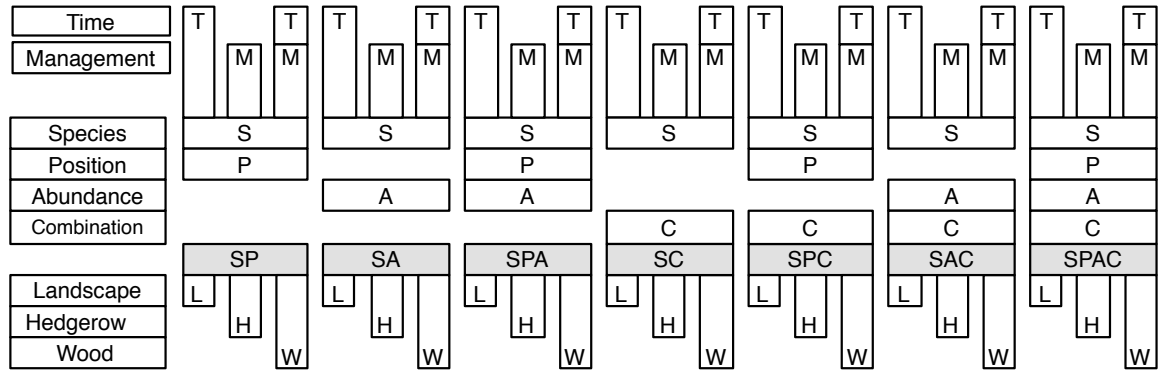


Figure 221.90 - SPACES diagram showing the makeup of the possible SPACES elements in relation to time [T], management [M] and scale [L] [W] or [H].

7.29. The basic seven possible combinations of core SPACES elements are:

7.30. **Species + Position [SP]** - Does a species occur only at specific positions or over the whole study area? These [SP] associations can be the result of:

- 7.30.a local growing conditions - wet area
- 7.30.b original planting positions - History
- 7.30.c subsequent natural colonisation
- 7.30.d deliberate planting
- 7.30.e aggressive colonisation or planting.

7.31. **Species + Abundance [SA]** - Is the species always found at a particular abundance with no apparent association with position, e.g. always rare or always common?

7.32. **Species + Position + Abundance [SPA]** - Is the species at a certain abundance in particular positions?

7.33. **Species + Combination [SC]** - Do certain combinations occur with no apparent pattern of position or abundance?

7.34. **Species + Position + Combination [SPC]** - Are particular combinations of species found in defined positions?

7.35. **Species + Abundance + Combination [SAC]** - Are the species in combinations at predicable abundances?

7.36. **Species + Position + Abundance + Combination [SPAC]** - Are there similar combinations and abundances at a number of different location?

7.37. These can be summarised on the diagram at Figure 222.91.

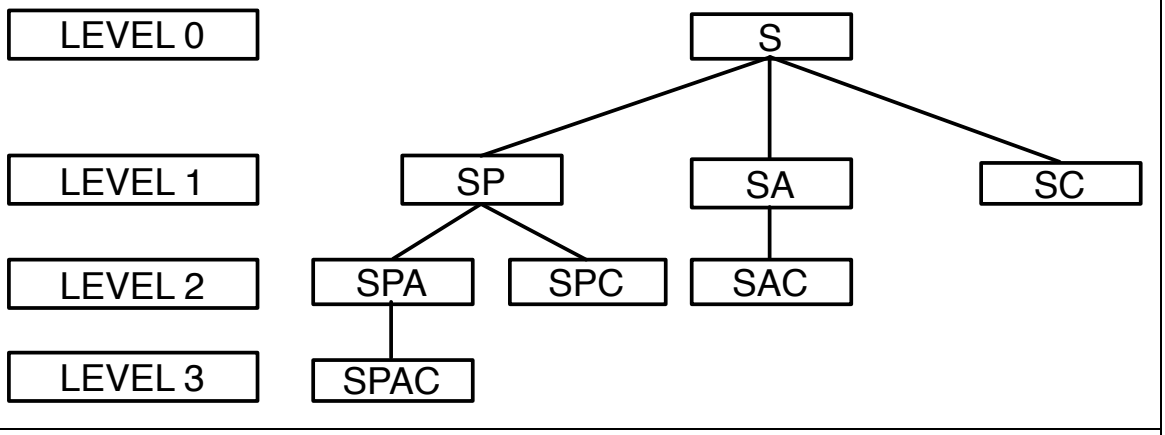


Figure 222.91 – Diagram showing hierarchy of combining elements of SPACES

7.38. At Level 1 it may only be possible to observe an association of two of the SPACES elements

7.38.a [SP] - The [S]pecies is found at defined [P]ositions but shows no systematic [A]bundance or [C]ombination with other species

7.38.b [SA] - A [S]pecies that has a particular [A]bundance but does not seem to be found at any specific [P]osition or in any [C]ombinations.

7.38.c [SC] - [C]ombinations of [S]pecies that show no pattern for [P]osition or [A]bundance.

7.39. For Level 2 there can be three elements.

7.39.a [SPA] - The [S]pecies is present at specific [p]ositions and at certain [A]bundances, but not in any [C]ombinations.

7.39.b [SPC] - Certain [S]pecies [C]ombinations occur in particular [P]ositions but at no recognisable [A]bundances.

7.39.c [SAC] - There are [S]pecies [C]ombinations at certain [A]bundances but not in any pattern of [P]osition.

7.40. Level three associates all elements of SPACES.

7.40.a [SPAC] - [S]pecies are found in certain [P]ositions, at defined [A]bundances and in recognisable [C]ombinations.

7.41. **Scale [L] [H] [W] -** The seven core SPACES elements combinations can be considered at both the Landscape ([L]) and feature level ([H] [W]), e.g. a species may be abundant in the landscape, but rare at the wood/ hedgerow level and *vice*

versa. These are added as qualifiers to the SPACES codes. Examples are:

7.41.a **[SPA][W]** - A [SPA] species at the Woodland level where it occurs in particular parts of the woodland at predicable levels of abundance.

7.41.b **[SPA][L]** - A [SPA] species at the landscape level being found at specific locations and at a particular abundance in parts or all of the landscape.

7.41.c **[SPA][H]** - A [SPA] species at the Hedgerow level that is only at a predictable position in the hedgerow (e.g., at the end, or everywhere) and at a defined abundance level.

7.42. Combining the time/ management + the core SPAC elements and the scale [L] [H] [W] produces a range of 'signatures' that a species, or combination of species, may have. These signatures can be approached from the species perspective or the combination perspective as follows.

Species Analysis

7.43. From the species perspective, consideration of the following elements and combinations of elements are studied at both the landscape scale and hedgerow scale. The species in a hedgerow or in the landscape are evaluated in combination with the other three elements to see if there are any species present that are characteristic of the study that show a pattern for position or have a particular abundance level.

7.44. The species may be present in the study area as a result of historic planting, in which case it will have positions on specific hedgerows in the landscape [SP][L] associated with time and will therefore have a time-species-position-landscape [T][SP][L] signature. Another species may be typical of wet areas in the landscape regardless of historic planting and would therefore be [SP][L]. The [S] code cannot be used without combining it with another element or elements except to comment on the characteristics of the species itself that may influence its occurrence in the study area.

7.45. In relation to hedgerows, scenarios for the combinations of SPACES elements are as follows:

7.46. **Species + Position [SP]** - Species can be located in specific parts or all parts of the landscape [SP][L] or in localised sections or all parts of hedgerow [SP][H] in combination with time [T] and management [M].

7.46.a **[SP][L]** - A species associated with specific positions in the landscape at no particular abundance and not

linked to history or management,

e.g., a species favouring wet conditions like Alder or Grey Willow, or Hawthorn that occurs everywhere.

7.46.b **[SP][H]** - A species and position association at the hedgerow level at no particular abundance and not linked to history or management, e.g., a species only found at the ends of hedgerows, like English Elm, starting to migrate along a newer hedgerow from an old one.

7.46.c **[T][SP][L]** - A species linked to history that is found in certain parts of the landscape, e.g., a species favoured during an enclosure award planting phase like Hawthorn, Blackthorn, Hazel, Crab Apple etc.

7.46.d **[T][SP][H]** - Historically a species found in certain parts of a hedgerow that can be assigned to a particular time or phase, e.g., a species like Pedunculate Oak that was planted every 7 yards in nearby *Scoreby*.

7.46.e **[M][SP][L]** - As the result of specific management actions a species is found in certain parts of the landscape e.g., there is evidence of laying, or the species is present as a tree and as a shrub in various places in the landscape with no apparent link to history. This could be the result of trees seeding into the hedge, trees 'getting away' or being actively avoided during trimming to create standards and may be a deliberate action to have the species in the hedgerow in both forms. However, this may link to a time for such laying (see 7.46.d) and would be [TM][SP][L].

7.46.f **[M][SP][H]** - Management at certain positions along the hedgerow have determined the species presence in the hedgerow, e.g., removing a shrub or planting into a gap.

7.47. **Species + Abundance [SA]** - species may occur at similar abundances across the study area, and within individual hedgerows, with no apparent preferences for Position. Again at both landscape and hedgerow scales [SA][L] and [SA][H].

7.47.a **[SA][L]** - A species that is at a certain general level of frequency across the landscape regardless of other considerations, e.g., Bramble may occur in almost all hedgerows regardless of location or when the hedgerow was

created.

7.47.b **[SA][H]** - A species that is at a certain general level of frequency or abundance in a hedgerow regardless of other considerations, e.g., Bramble may be occassional to frequent in almost all hedgerows regardless of location or when the hedgerow was created.

7.47.c **[T][SA][L]** - As a consequence of history a species has an abundance at the landscape. This may also link to position and such species will be [T][SP][L] (see 7.46.d) or [T][SPA][L] (see 7.48.c).

For example a species present in earlier phases of hedgerow formation may subsequently be actively discouraged, like Barberry (the host of a rust in wheat). Its abundance in the landscape can be linked to the time (and probably also management - see 7.47.d) when it was recognised as a problem species and became the target of active removal.

7.47.d **[M][SA][L]** - A species may be actively encouraged by management over time (but not confined to a particular era or phase), or removed from hedgerows regardless of their time of creation or their histories, e.g. Elder has often been regarded as a weed and sytematically removed from all hedgerows of any age and is ongoing.

7.47.e **[M][SA][H]** - A species may be actively managed and encouraged into gaps in hedgerows at high frequency/ abundance, e.g. a monculture of Hawthorn may have been used to fill gaps in a more species rich old hedgerow, or conversely a species-rich mix can be used to fill the gap in a monoculture Hawthorn hedgerow.

7.48. **Species + Position + Abundance [SPA]** - some species may be located at particular parts of the landscape [SPA][L] or places along a hedgerow [SPA][H] and be at a predictable level of Abundance.

7.48.a **[SPA][L]** - A species that is found in certain places in the landscape, e.g., on a number of hedgerows in the landscape Hazel is at an abundance of frequent but there is no indication that this is linked to history.

7.48.b **[SPA][H]** - In hedgerows a species that is found at certain points (or is general thoughout) at a particular abundance, e.g., in a hedgerow that contains English Elm it may be only at the ends and dominant at that point (see 7.48.d).

7.48.c **[T][SPA][L]** - Historically, in the landscape a species that is at certain locations and has a particular abundance, e.g., Purging Buckthorn is usually found on medieval hedgerows that are often on township boundaries and the species is usually rare when it occurs.

7.48.d **[T][SPA][H]** - In a particular historical context a hedgerow species is at certain locations at a particular abundance, e.g., Guelder-rose may have been recently planted into gaps in particular sections of hedgerow as an enhancement.

7.48.e **[M][SPA][L]** - The management could relate to a position and the frequency of a species in hedgerows. Hedgerows in the landscape may have been managed by gapping up regardless of the age or history of the hedgerow, e.g., during the 1970s and to date many schemes encouraged farmers to restore and gap-up hedgerows.

7.48.f **[M][SPA][H]** - The consequence of 7.48.e could be the unexpected high frequency of Guelder-rose in gapped up sections of hedgerow.

Combination Analysis

7.49. The main principle behind the assessment of the combination of species in a hedgerow is derived from the standard phytosociology assessments where relevee's (hedgerows) are assigned to groups with similarities. With regard to hedgerows there is an expectation that there will be a number of deliberately planted and desired species such as Hawthorn and Blackthorn present in all hedgerows. Other species will be less frequent and less abundant all the way down to a single specimen of a species.

7.50. It is necessary to tease out some of the less abundant species to determine if they are informing about the history and management of hedgerows through time. These are referred to as the 'differential species' by authors like Kent and Coker (1992). These are generally species that are present in

approximately 50% of the hedgerows surveyed. It is important to be cautious with some of the rarer species as these may be plantings on a whim by the owners that may not follow a general planting mix from, say, an enclosure specification.

7.51. As already emphasised some of these 1st decile species are critically important in interpreting the history of the hedgerows from the species perspective. Care must be exercised in accounting for these. In most cases they are reliable historic markers if it can be asserted that they are there through natural processes from history rather than recent introductions as part of a biodiversity enhancement.

7.52. The object of this part of the analysis is to determine if there are patterns in the way combinations of shrubs appear in hedgerows of datable periods, or can indicate subsequent changes and management practices. There are two aspects of the combination component of the analysis.

7.52.a Evidence of specific group or combination planting or inheritance from an historic wooded landscape.

7.52.b The presence of two or more historic marker species forming a combination with increasing confidence as more species are added to the mixture.

7.53. The concept considered is that hedgerows formed during specific phases were initially planted with the same mix of species and today these can still be recognised, assuming they have been subject to similar management during the intervening period. For example, it could be that 1709 enclosure hedgerows contained Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa and* Holly *Ilex aquifolium*. Whereas 1772 enclosure hedgerows contained Hawthorn, Blackthorn, **Hazel** *Corylus avellana*, **Crab Apple** *Malus sylvestris* and **Elder** *Sambucus nigra*. Here, Hazel, Crab Apple and Elder are missing from the earlier period and are added to the later enclosures. This concept is likely to be subject to variation in that, even though a specific planting mixture may have been recommended for a given enclosure award, there is no guarantee that individual farmers followed this mixture. It is therefore likely that a number of signatures for combination may be applicable to different areas of farm ownership within an enclosure award area.

7.54. The other concept is that a combination of some of the 1st decile species may provide supporting and corroborating evidence of historic origins and management. This is based on a principle that certain species have been determined as

indicating medieval origins (unless there is obvious evidence of recent planting). If certain individual species can be regarded as 'medieval species' then it follows that if several of these are combined that this will be supporting evidence that gives increased confidence to the assumption that the hedgerow is of a particular phase. An example would be if Spindle, Guelder-rose and English Elm are individually regarded as medieval species, then if this combination was to occur on a hedgerow this is likely to further emphasise that this hedgerow is of medieval origin. From this concept of combination analysis any two or more species of our historic marker species will constitute a combination. Clearly, the more species added to the combination the greater will be the confidence of asserting that they are historic markers.

7.55. Similarly, it could be that hedgerows formed during two different phases may contain essentially the same combination of species, but they may be at different levels of abundance [SAC]. This type of association may occur across the entire landscape, or a particular species abundance combination may be specific to particular allotees at the time of enclosure.

7.56. As with the species analysis approach above, the combination element of the species composition is considered with other SPACES elements.

7.57. **Species + Combination [SC]** - are certain combinations of species found where there is no apparent systematic position or abundance association

7.57.a **[SC][L]** - A particular combination of species is found across the study area without any historical reason or indications of systematic position, abundance. For example, the combination of Hawthorn, Blackthorn and Elder may be a common feature of some hedgerows in the landscape with no further indications about why these have that combination.

7.57.b **[SC][H]** - A particular combination of species is found in certain parts of the hedgerows. For example, random sections of a rich mix of species along a hedgerow dominated by Hawthorn.

7.57.c **[T][SC][L]** - Historically a specific combination of species is in hedgerows in the landscape. This is linked to specific eras or phases if known, otherwise their positions should be noted and considered for determining any [T][SPC][L] signature. For example, does the combination of Hawthorn, Blackthorn, Hazel, Field Maple and Dogwood occur

randomly or should it be considered in relation to position [P]?

7.57.d **[T][SC][H]** - History reflects a specific combination of species in sections of hedgerows. This may be indicative of the recommendations at the time these hedgerows were gapped up. For example, does the combination of Hawthorn, Blackthorn, Hazel, Field Maple, Guelder-rose, Crab Apple, Holly and Dogwood indicate over-the-top species enhancement in a Hawthorn dominated hedgerow?

7.57.e **[M][SC][L]** - The management affects the species combinations at the landscape level. At the landscape level it is unlikely that this combination of elements has any meaningful contribution to the interpretation. Species combinations at the landscape scale will be a reflection of the combinations at the hedgerow scale and this combination of SPACES elements is not valid and the [M][SC][H] (see 7.57.f) signature is used to convey this interpretation.

7.57.f **[M][SC][H]** - The management affects the species combinations at the hedgerow level. For example, is a species combination different in a hedgerow where the owner has systematically removed one, or more, species?

7.58. **Species + position + Combination [SPC]** - are particular combinations of species found at specific positions in the landscape [SPC][L], or along hedgerow [SPC][H] lengths at no particular level of abundance.

7.58.a **[SPC][L]** - Certain parts of the landscape have specific species combinations that do not seem to have an associated timeframe or management reason. As an example, the combination of Hawthorn, Blackthorn and Elder may be a common feature of hedgerows from many different origins and may not be diagnostic for a specific phase. Otherwise 7.58.c can be applied.

7.58.b **[SPC][H]** - There is a systematic reason why particular hedgerows have certain combinations, for example, on an open cast coal restoration site where the restoration planting was of a standard mix. This may possibly be datable [T][SPC][L] (see 7.58.c).

7.58.c **[T][SPC][L]** - Historically specific species combinations occur in certain parts of the landscape. For example, the planting of areas of restored land as described at 7.58.b.

7.58.d **[T][SPC][H]** - History explains why certain combinations are in particular sections of hedgerow. For example, where a pipeline crossed the landscape and the restoration planting was of a standard mix.

7.58.e **[M][SPC][L]** - Management practices have produced the species combination at certain locations in the landscape. As an example, have some landowners either encouraged or removed species to result in the current combinations? These may also be linked to history [T].

7.58.f **[M][SPC][H]** - Management practices have created the species combination at certain locations in the hedgerow. This is largely similar to 7.58.e in that some landowners either encouraged species into gaps or removed species from sections to result in the current combinations. Again these could also have historical context [T].

7.59. **Species + Abundance + Combination [SAC]** - is there any systematic level of abundance associated with particular hedgerows, independent of their position [SAC][L] and [SAC][H]?

7.59.a **[SAC][L]** - The species abundances in combinations at the landscape scale is predictable. For a combination of say Hawthorn, Blackthorn, Hazel, Holly, Crab Apple, the abundances may be approximately the same between hedgerows (Hawthorn - AD, Blackthorn - AD, Hazel - F, Holly - FA, Crab Apple - FF?) but there is no indication that this has any historical significance nor that there is a reason for these being at the positions they are found at.

7.59.b **[SAC][H]** - At the hedgerow scale the abundances of species in combinations are similar. Within a hedgerow where a combination occurs are the species in approximately the same abundance compared with the same combination group either elsewhere in the same hedgerow or in another hedgerow?
For example, where a hedgerow is gapped up the same general species abundances were used, i.e, the species were

mixed to maximise the diversity in each gap.

7.59.c **[T][SAC][L]** - History determines the abundance of species in combinations. This would be where 7.59.a is determined by historical evidence, e.g., the mix at 7.59.a can be assigned to a phase of planting.

7.59.d **[T][SAC][H]** - History explains the abundances of species combinations in hedgerows, e.g., 7.59.b is determined by historical evidence.

7.59.e **[M][SAC][L]** - Management has produced the frequency of combinations of species at the landscape level. Has selective encouragement or removal produced the level of frequency observed in the combinations at the landscape level? For example, is Elder less abundant in some hedgerows because of active removal by a certain farmer?

7.59.f **[M][SAC][H]** - Management practices at the hedgerow level have moulded the abundances of species in combinations. This essentially mirrors 7.59.e but at the hedgerow level.

7.60. **Species + Position + Abundance [SPAC]** - where combinations occur are they at specific positions and at particular levels of abundance [SPAC][L] and [SPAC][H]?

7.60.a **[SPAC][L]** - There is a pattern of species at certain positions, at defined frequency in recognisable combinations in the landscape. From 7.59.a, is there a pattern to the distribution of the combination of species and their abundance across the landscape, e.g., where Alder is in the hedgerow is it at similar abundance compared with other hedgerows with that species and is this group of hedgerows simlar in species makeup and abundance to others in the same area (positions)?

7.60.b **[SPAC][H]** - There is a linkage between species at certain positions, at predictable abundances in recognisable combinations in the hedgerow. Essentially the hedgerow scale version of 7.60.a.

7.60.c **[T][SPAC][L]** - There is an historical basis for the position of species at defined frequency in combinations they are in at the landscape level. This places 7.60.a into its

historical context. This is a primary hope of surveys of this type as they aim to show that the composition of some hedgerows can be used as markers to indicate a common origin or development through time.

7.60.d **[T][SPAC][H]** - There are historical reasons for the position of species at defined abundances in the combinations they are in at the hedgerow level. This is likely to detect fragments of 7.60.c in hedgerows that may have been significantly replanted or modified.

7.60.e **[M][SPAC][L]** - Management has created the pattern of species, being in certain positions at defined abundances in the combinations they are recorded in at the landscape level. If the combination of position, frequency and combination cannot be linked to time, then it may be explained by the management the hedgerow has received.

7.60.f **[M][SPAC][H]** - Management has resulted in the pattern of species, being in certain positions at defined abundances in the combinations they are recorded in at the hedgerow level. The hedgerow scale reflection of 7.60.e.

Signatures

7.61. Consideration of the element combinations can lead to a signature being identified. In some cases a species may be present in a number of signatures. As an example English Elm *Ulmus procera* has a number of signatures all of which are variations of [T][SPA][H]:

7.61.a It occurs on confirmed medieval boundaries where it is a dominant component [T][SPAA][H].

7.61.b Within some medieval boundaries it is less abundant [T][SPaa][H].

7.61.c There are positions in the landscape where its presence suggest undocumented boundaries that could be pre-medieval (coaxial fields and track associated with an earlier field system) [T][SPaA][H] and [T][SPAA][H]

7.61.d There are indications that it is slowly colonising along hedgerows that have recently been created leading off an older hedgerow [T][SPaa][H].

The SPACES process

7.62. The process involves careful consideration of the species recorded in the context in which they are found at both the landscape and hedgerow levels. Any historical information available is used to aid the interpretation. At the very least it is likely that the township boundaries are available as a historical starting point for some of the interpretations. Information may also be available on the time of any parliamentary or other enclosures of the landscape.

7.63. As the process involves looking for patterns of species distribution in the landscape, it is not essential to have such historical information. What the process will do will be to identify areas where certain species occur that will stimulate the need to investigate the reasons behind these occurrences using any historical research available.

7.64. Another aspect of the process is that if a correlation between species, position, abundance and combination has been determined for a nearby township, it may be possible to extrapolate these data into the area of current study. As an example for the Dunnington study similar patterns of distribution were recorded in the nearby township of *Scoreby* that could be transferred into the findings from the Dunnington survey.

7.65. In any survey it is likely that there will be a range of species that are very common or even ubiquitous across the entire study area. These are unlikely to be informative as historic markers. The only likely interpretive use of these will be if such common species are absent from certain parts of the landscape. This could indicate a systematic planting that excluded certain species during, for example, an enclosure award planting.

7.66. The SPACES approach process essentially begins by looking at some of the rarer species in the landscape. In many cases these species are found in less than 10% of hedgerows in the study area (1st decile species). This is partly based on the fact that, in many landscapes, there were a very large number of hedgerows planted during various enclosure periods throughout history. This means that potentially up to as many as 80% or more of the current stock of hedgerows are of relatively recent origins and may have been planted with a restricted range of species compared with earlier established examples. It has become apparent from doing hedgerow surveys that it is often the rarer species that are more diagnostic as historic markers than the more common species.

7.67. It is likely that, historically, hedgerows were a more valued resource and were planted with a range of species that were of value to the community. Subsequent plantings are more likely to have been utilitarian in nature and were designed purely to create a stock proof barrier between fields. Therefore, the species included were largely irrelevant and were often chosen for their ease of acquisition or for reasons such as the suitability for a stock barrier by being thorny etc.

7.68. With, or without, supporting historical information the analysis process begins by determining which of the rare species may be informing as historic markers. At this stage care should be taken as there will be a number of species that could confound or confuse the process without some knowledge of their likely historical origins. It will be a matter of local research that determines which species are credible historic markers compared with those that may have been introduced as ornamental plantings in relatively recent times. For example, it is unlikely that Lilac will have been a significant hedgerow component in the past and may just be a chance seeding from a local garden.

7.69. Determining which species are likely to be relevant is a difficult task that is likely to be aided by any historical knowledge available.

7.70. Once it has been established which are relevant species likely to inform as historic markers, these need to be mapped to determine if there is any pattern to their distribution across the landscape that can be determined as indicating historic origins. For example if a species was found to be restricted to the township boundaries this would be a strong indication that this species was an historic marker.

7.71. If this species was also found within the survey area on a number of hedgerows that could not be categorically dated to the medieval period, this would not necessarily mean that they were not medieval species, it could be that they are species from the medieval period, but that there is no current evidence to support this status. Such evidence may become apparent later when further historical research is done.

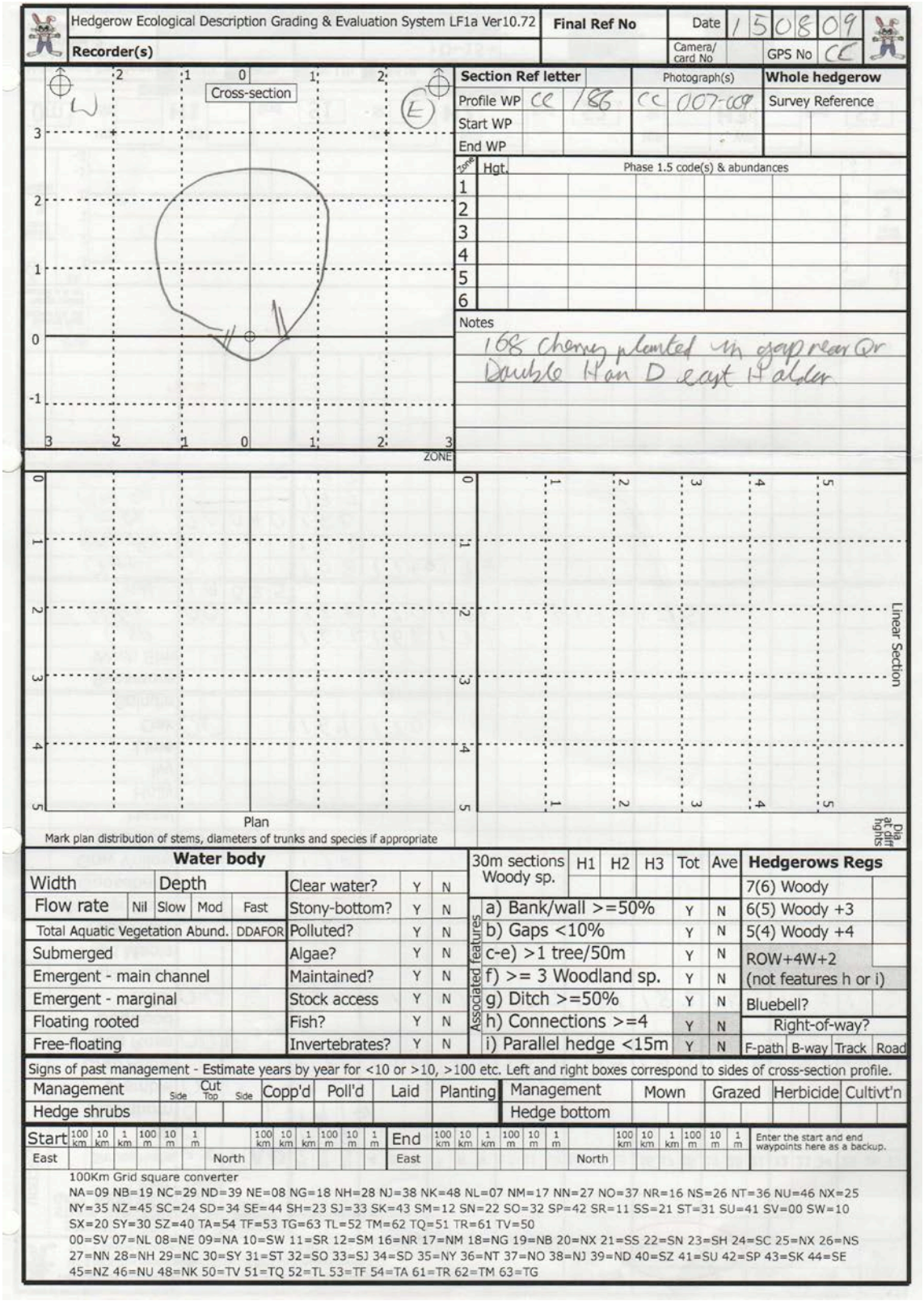
7.72. Having established one or more species as being historic markers for the township boundaries (medieval) the next stage would be to consider the other species found within these hedgerows to determine if there were any combinations that were common to medieval township boundaries. These combinations could again be used to look for internal boundaries where similar combinations were found and support

the evidence that it is likely that this combination is indicative of medieval origins.

7.73. The whole process relies on identifying signatures from both the species and combination perspectives. There are a number of species that clearly mark historic creation times. Such species are also posing interesting questions as to why they occur on features that cannot be categorically dated. An example is English Elm that has a strong affinity for township boundaries and medieval field boundaries but is also found on hedgerows, in quantity, where there is no historic confirmation of origin.

Appendix 236.3 – Example Field Recording Forms

Figure 236.92 - An example field record form - Front side LF1a



Hedgerow Ecological Description Grading & Evaluation System LF1a Ver10.72

Final Ref No

Date 15/08/09

Recorder(s)

Camera/ card No

GPS No CC

Cross-section

Section Ref letter

Photograph(s)

Whole hedgerow

Profile WP CC /86 CC 007-009

Survey Reference

Start WP

End WP

Zone | Hgt. | Phase 1.5 code(s) & abundances

1

2

3

4

5

6

Notes

168 Cherry planted in gap rear Or Double Ham D east H alder

ZONE

Plan

Mark plan distribution of stems, diameters of trunks and species if appropriate

Linear Section

Dia at diff hghts

Water body

Width		Depth			Clear water?	Y	N	
Flow rate	Nil	Slow	Mod	Fast	Stony-bottom?	Y	N	
Total Aquatic Vegetation Abund.				DDAFOR	Polluted?	Y	N	
Submerged					Algae?	Y	N	
Emergent - main channel					Maintained?	Y	N	
Emergent - marginal					Stock access	Y	N	
Floating rooted					Fish?	Y	N	
Free-floating					Invertebrates?	Y	N	

30m sections Woody sp.	H1	H2	H3	Tot	Ave	
Associated features a) Bank/wall >=50%				Y	N	
b) Gaps <10%				Y	N	
c-e) >1 tree/50m				Y	N	
f) >= 3 Woodland sp.				Y	N	
g) Ditch >=50%				Y	N	
h) Connections >=4				Y	N	
i) Parallel hedge <15m				Y	N	

Hedgerows Regs

7(6) Woody

6(5) Woody +3

5(4) Woody +4

ROW+4W+2 (not features h or i)

Bluebell?

Right-of-way? F-path | B-way | Track | Road

Signs of past management - Estimate years by year for <10 or >10, >100 etc. Left and right boxes correspond to sides of cross-section profile.

Management	Side	Cut Top	Side	Copp'd	Poll'd	Laid	Planting	Management	Mown	Grazed	Herbicide	Cultivt'n
Hedge shrubs								Hedge bottom				

Start	100 km	10 km	1 km	100 m	10 m	1 m		End	100 km	10 km	1 km	100 m	10 m	1 m		Enter the start and end waypoints here as a backup.
East							North	East							North	

100Km Grid square converter

NA=09 NB=19 NC=29 ND=39 NE=08 NG=18 NH=28 NJ=38 NK=48 NL=07 NM=17 NN=27 NO=37 NR=16 NS=26 NT=36 NU=46 NX=25
NY=35 NZ=45 SC=24 SD=34 SE=44 SH=23 SJ=33 SK=43 SM=12 SN=22 SO=32 SP=42 SR=11 SS=21 ST=31 SU=41 SV=00 SW=10
SX=20 SY=30 SZ=40 TA=54 TF=53 TG=63 TL=52 TM=62 TQ=51 TR=61 TV=50
00=SV 07=NL 08=NE 09=NA 10=SW 11=SR 12=SM 16=NR 17=NM 18=NG 19=NB 20=NX 21=SS 22=SN 23=SH 24=SC 25=NX 26=NS
27=NN 28=NH 29=NC 30=SY 31=ST 32=SO 33=SJ 34=SD 35=NY 36=NT 37=NO 38=NJ 39=ND 40=SZ 41=SU 42=SP 43=SK 44=SE
45=NZ 46=NU 48=NK 50=TV 51=TQ 52=TL 53=TF 54=TA 61=TR 62=TM 63=TG

Figure 237.93 - An example field record form - Reverse side LF1b

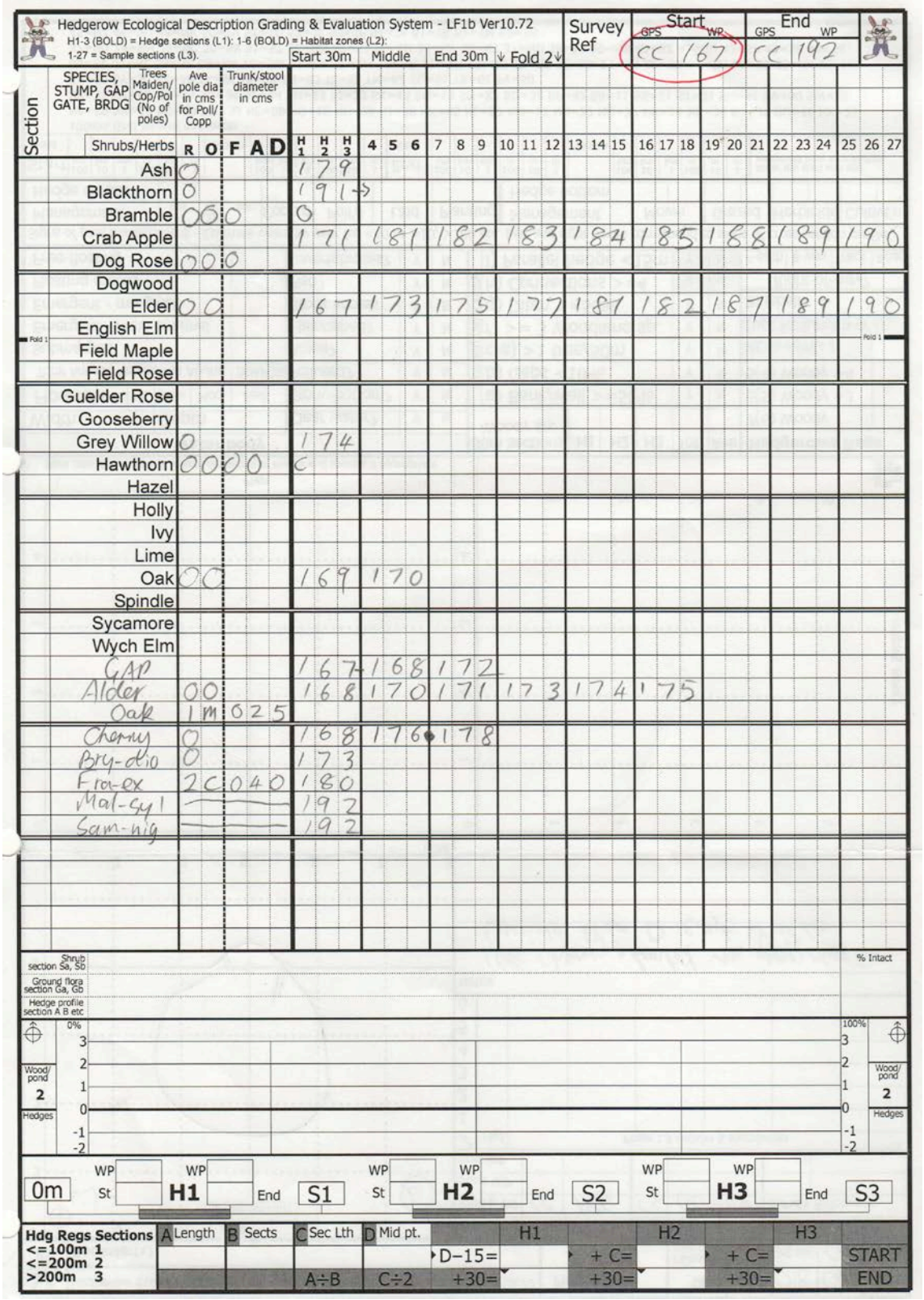
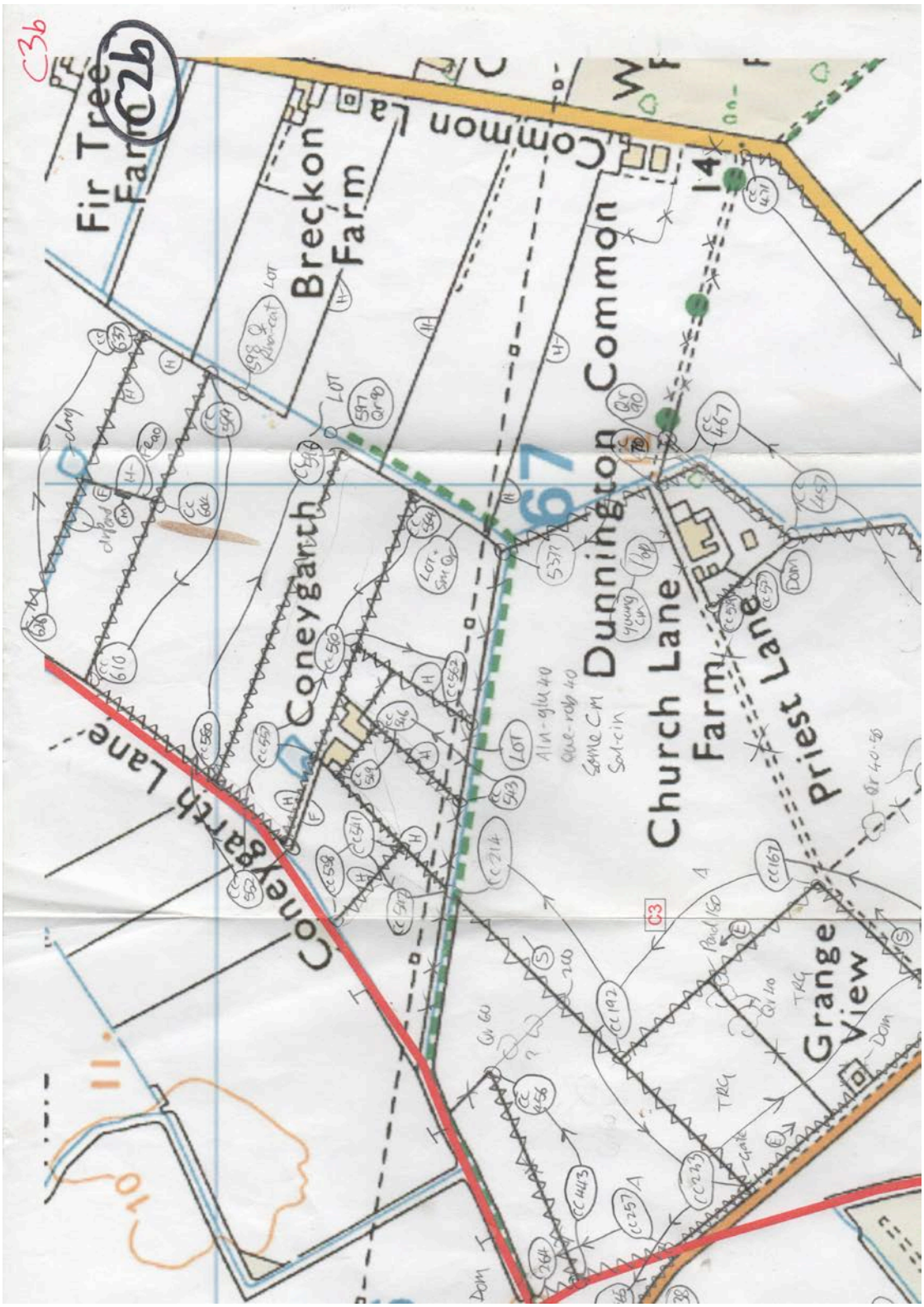


Figure 238.94 - An example field map - reduced from its original A3 size.



Appendix 239.4 - Maps from Scoreby showing concentric ring pattern and the distribution of English Elm.

Figure 239.95 - The concentric medieval or pre-medieval ring field system at *Scoreby* on a 1st ed. OS base centred on the former medieval Scoreby Manor.

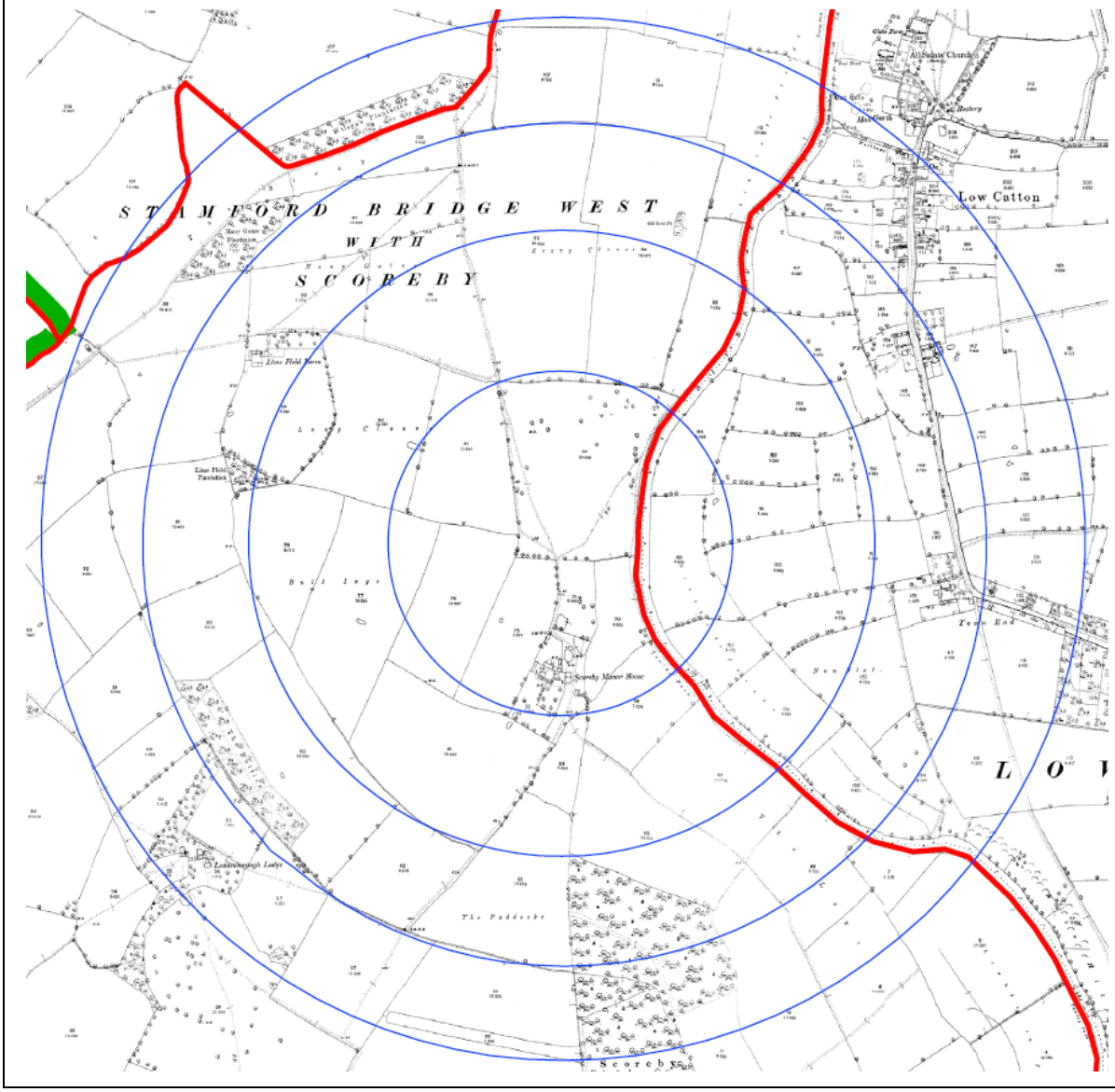


Figure 240.96 - The concentric medieval or pre-medieval ring field system at Scoreby on a modern base centred on the former medieval Scoreby Manor.

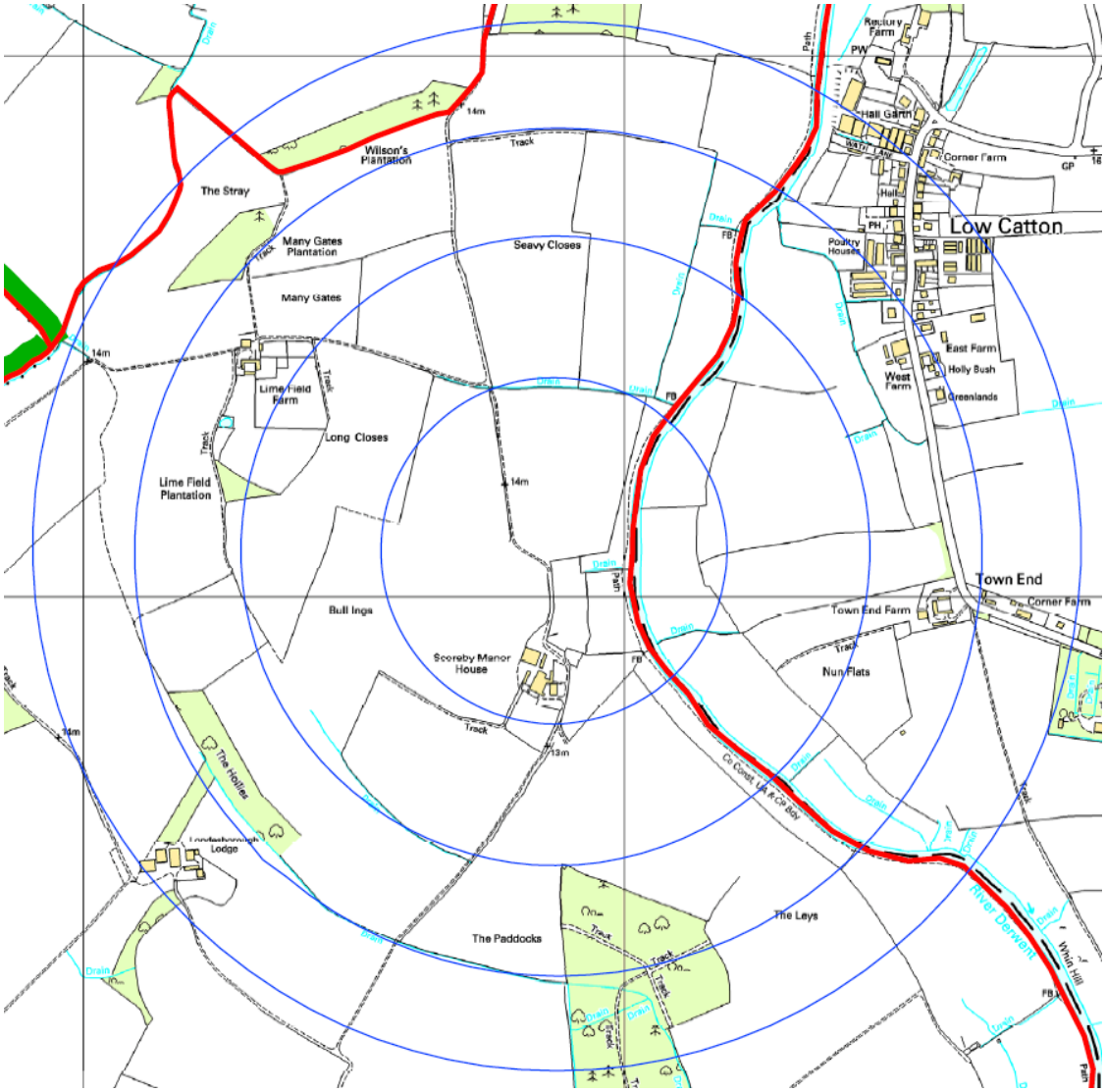
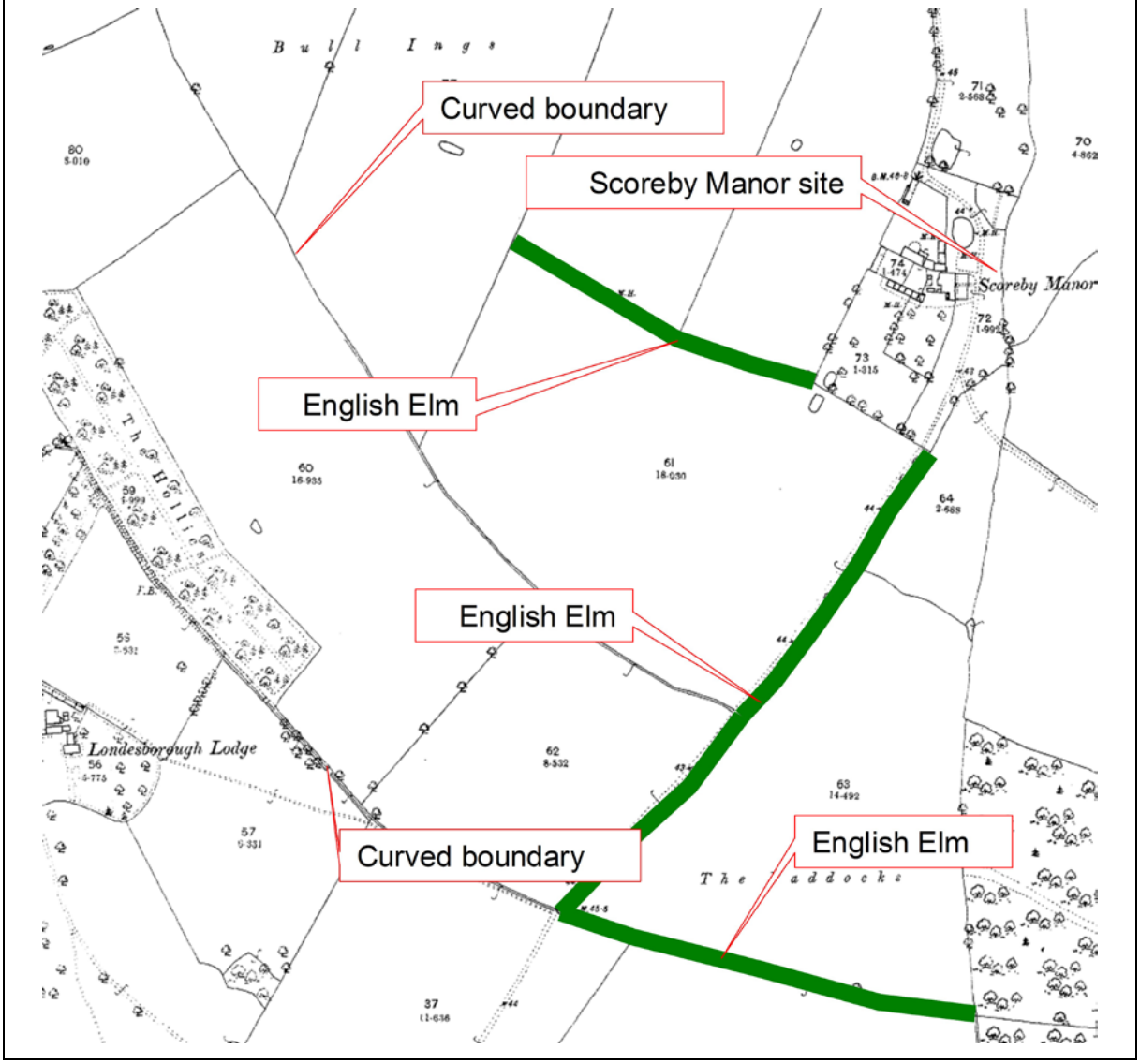


Figure 241.97 - Close-up of the middle of the concentric fields at Scoreby showing which hedgerows are English Elm dominated.



Appendix 242.5 – Combination analysis tables

7.74. These tables are ordered with most frequent species to the left.

7.75. The pale blue columns are the differential species (around 50% presence) that have been moved to the left of the table to make it easier to look for patterns in the data. Where all species are present these are coloured darker green and reflected in the differential counts. Less constant species are below in increasingly paler shades of green where constancy decreases to 3, 2, 1 and 0.

7.76. The dark pink cells show the concordance with some historic marker species indicating a correlation between high constancy of the mid-core species and their combination with historic marker species. Paler pink are less diagnostic or are species of historic significance.

7.77. To the left, the columns summarise which species are present in the combinations where 3, 2 or 1 of the differential species are present. For example if there are three differential species along a particular hedgerow there are four ways that these could be represented. For [DU-2] the species could be

- 7.77.a Blackthorn, Crab Apple, Hazel
- 7.77.b Blackthorn, Crab Apple, Field Maple
- 7.77.c Blackthorn, Hazel, Field Maple
- 7.77.d Crab Apple, Hazel, Field Maple

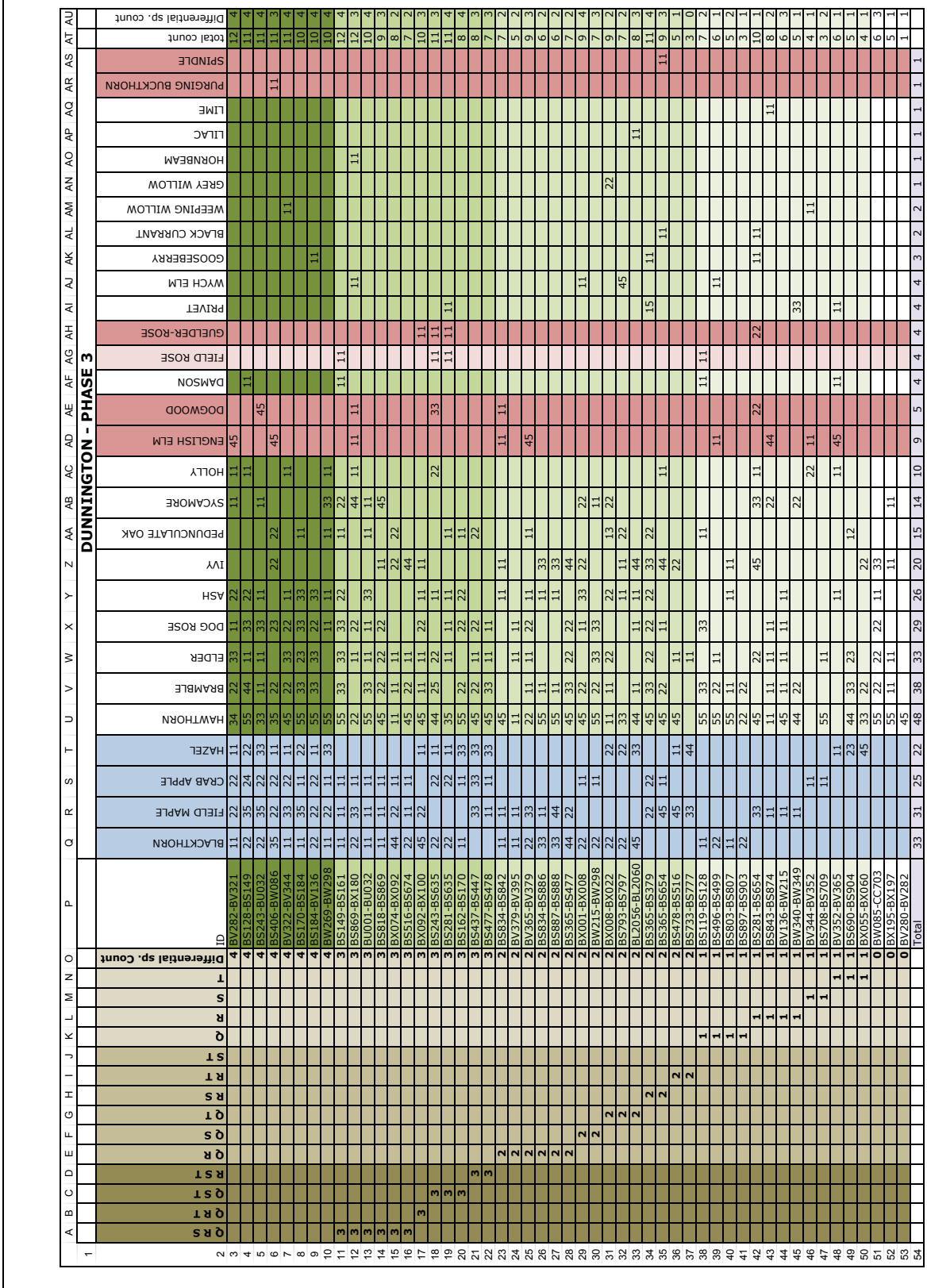
Table 243.44 – Combination table for Dunnington phase 1.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1																	**DUNNINGTON - PHASE 1**																					
2	**Q R S**	**Q R T**	**Q S T**	**R S T**	**Q R**	**Q S**	**Q T**	**R S**	**R T**	**S T**	**Q**	**R**	**S**	**T**	**Differential sp. Count**	ID	FIELD MAPLE	CRAB APPLE	HAZEL	DOGWOOD	BLACKTHORN	ELDER	HAWTHORN	BRAMBLE	DOG ROSE	ASH	PEDUNCULATE OAK	FIELD ROSE	HOLLY	DAMSON	BLACK CURRENT	GUELDER-ROSE	IVY	PURGING BUCKTHORN	SPINDLE	SYCAMORE	Total count	Differntial sp. count
3	**3**	**3**	**3**												**4**	BS198-BS243	33	22	33	11	34	11	45	22	22	11	22	11		14		11		23				15	4
4	**3**	**3**	**3**	**3**											**4**	BS569-BS620	11	22	35	22	45	11	35	22	22	11	11		11	22								13	4
5		**3**			**3**										**3**	BS149-BT180	22	11		25	35	33	44	22	11	11	22	11	35									12	4
6		**3**													**3**	BS306-BS327	11	22		22	11		45	11	11	11	22				11							10	4
7			**3**												**3**	BS545-BS568	22		44	11	33	22	45	11	11	22	11										10	4
8			**3**												**3**	BU131-BU148	11		22	11	45	11	22		11	11			11						11		9	3
9					**2**						**1**	**1**			**2**	BS281-BS306	11	11			35	33	45	22	22		22	11	11								10	3
10					**2**						**1**	**1**			**2**	BS327-BW085	11	11			45	22	45	22	22		22	11									9	3
11												**1**			**1**	BU256-BU269		11			22	22	55	22	22	22											7	3
12													**1**		**1**	BU148-BW033			33		44	11	44	22	22	22	22	11									9	4
13													**1**		**1**	BW085-CC705			22		22	22	44	22									44				6	1
14												**1**			**1**	BU120-BU131			11		44	11															3	0
15															**0**	BV230-BV279					22	11	45	33	33	22			11						33	8	3
16																Total	8	7	7	6	13	12	12	11	11	9	8	5	4	2	1	1	1	1	1			
17																Percent	62%	54%	54%	46%	100%	92%	92%	85%	85%	69%	62%	38%	31%	15%	8%	8%	8%	8%	8%			

Table 244.45 – Combination table for Dunnington phase 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX
1																	**DUNNINGTON - PHASE 2**																																	
2	**Q R S**	**Q R T**	**Q S T**	**R S T**	**Q R**	**Q S**	**Q T**	**R S**	**R T**	**S T**	**Q**	**R**	**S**	**T**	**Differential sp. Count**	ID	**BLACKTHORN**	**CRAB APPLE**	**HAZEL**	**FIELD MAPLE**	HAWTHORN	ELDER	BRAMBLE	DOG ROSE	ASH	ENGLISH ELM	HOLLY	GREY WILLOW	SYCAMORE	PEDUNCULATE OAK	GUELDER-ROSE	DOGWOOD	IVY	DOMESTIC APPLE	PRIVET	PURGING BUCKTHORN	WYCH ELM	ALDER	ASPEN	CHERRY	FIELD ROSE	GOOSEBERRY	GORSE	ROWAN	SILVER BIRCH	SPINDLE	WEEPING WILLOW	YEW	Total count	Differential sp. count
3															**4**	BH219-BH224	**33**	**11**	**34**	**23**	22	11	12	12	11			25	11	12	12					11													13	4
4															**4**	BV152-BV174	**22**	**11**	**11**	**11**	33	22	22	22	11						11				11														10	4
5															**4**	BW201-BW240	**22**	**11**	**33**	**44**	33	22	22	33	11	33																				11			10	4
6															**4**	BW240-BW258	**22**	**11**	**33**	**22**	33	33	22	22		22			44			11																	10	4
7	**3**														**4**	BS345-BS387	**35**	**11**	**11**	**11**	45	11	11							11		22																	8	4
8	**3**														**3**	BH227-BH229	**45**	**11**	**23**		45	11	11	22				11			11																		8	3
9	**3**														**3**	BS345-BS388	**34**	**22**	**11**		45	11		11	11				11	11																			8	3
10	**3**														**3**	BW258-BW269	**33**	**11**	**44**		55		22	33																									5	3
11	**3**														**3**	CE465-CE486	**22**	**11**	**11**		55	33																											4	3
12	**3**														**3**	BU001-BU120	**22**	**11**	**22**		45	22	11	11	22	11			11			11					22												11	3
13		**3**													**3**	BV054-BW169	**22**	**11**		**22**	45	22	11		22												11												7	3
14			**3**												**3**	BT180-BU256	**22**		**11**	**44**	55	11	11	11	11				11			11																	9	3
15			**3**												**3**	BS119-BU256	**11**		**22**	**11**	55	11	33	11	33		11		22																				9	3
16			**3**												**3**	BW443-BW465	**11**		**44**	**44**	44		22	11	44	55																							7	3
17					**2**										**2**	BS388-BW086	**35**	**11**			45		22																										3	2
18					**2**										**2**	BV036-BV054	**33**	**35**			44	33	33	22					11																				6	2
19					**2**										**2**	BS162-BV036	**22**	**22**			45	33	11		11		22		11						14														8	2
20						**2**									**2**	BG759-BX470	**45**		**23**		45	23	23				23	55					55															11	8	2
21						**2**									**2**	BH210-BL2026	**33**		**22**		44	11	33	33	11	44	11			11	11					11													11	2
22						**2**									**2**	CE486-CE508	**22**		**22**		55	22	22					11													44								6	2
23								**2**							**2**	BV141-BV152		**11**	**11**		44	11	22	11		11																							7	2
24									**2**						**2**	BW465-BW484		**22**		**44**	44		33	11	44																								6	2
25										**2**					**2**	BH212-BH219			**23**	**23**	45	22	11	22	11		24	22	11	11	23	12	24							35		11					12		17	2
26										**2**					**2**	BS755-BS760			**11**	**11**	11			11	11	55																							6	2
27											**1**				**1**	BG766-BX470	**44**				55	22	22	22									11																5	1
28											**1**				**1**	CF431-CF526	**22**				33	11		22																					22				4	1
29											**1**				**1**	BW433-BW442	**11**				22			11		45																							3	1
30											**1**				**1**	BG751-BG757	**44**				44	23	22																										3	1
31											**1**				**1**	BG757-BG758	**55**				11			22					33																				3	1
32											**1**				**1**	CE684-CE687	**11**																																0	1
33												**1**			**1**	CH337-CH364		**22**			45			22	11	22	11	22		33				11					22										10	1
34												**1**			**1**	CF526-CF654		**22**			22	22	33	22	22			11		11								55											9	1
35												**1**			**1**	CH364-CH404		**44**			44					22		22	11	33				33									11						8	1
36												**1**			**1**	CH314-CH337		**33**					22	22			22	11		22																			6	1
37												**1**			**1**	CF387-CF413		**11**			35	33	44	11			22																						6	1
38												**1**			**1**	CE687-CE713		**11**				11	11																										3	1
39													**1**		**1**	CH843-CH850			**45**			11					25																						3	1
40														**1**	**1**	BV175-BV186				**11**	45	11	22	11	33																								6	1
41														**1**	**1**	BW169-BW201				**33**	45	22	22	11	22																								6	1
42														**1**	**1**	BV141-BW484				**22**	44		11		22						44																		5	1
43															**0**	BH348-BH354					44				11		22			11																			4	0
44															**0**	BV186-BV203					11	11			11	55																							4	0
45															**0**	CF413-CF431					11	22					11																	11					4	0
46															**0**	CH309-CH313					44		22				11	22																					4	0
47															**0**	BV203-BV229						11				22																							2	0
48															**0**	BH224-BH227												33																					1	0
49															**0**	BS387-BS654						11																											1	0
50																Total	**26**	**22**	**20**	**15**	40	32	31	27	21	12	12	11	11	10	6	5	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1		
51																Percent	**55%**	**47%**	**43%**	**32%**	85%	68%	66%	57%	45%	26%	26%	23%	23%	21%	13%	11%	6%	4%	4%	4%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%		

Table 245.46 – Combination table for Dunnington phase 3.



DUNNINGTON - PHASE 3
Differential sp. count
ID
Percent
Q R S
Q R T
Q S T
R S T
Q R
Q S
Q T
R S
R T
S T
Q
R
S
T
BLACKTHORN 65%
FIELD MAPLE 61%
CRAB APPLE 49%
HAZEL 43%
HAWTHORN 94%
BRAMBLE 75%
ELDER 65%
DOG ROSE 57%
ASH 51%
IVY 39%
PEDUNCULATE OAK 29%
SYCAMORE 27%
HOLLY 20%
ENGLISH ELM 18%
DOGWOOD 10%
DAMSON 8%
FIELD ROSE 8%
GUELDER-ROSE 8%
PRIVET 8%
WYCH ELM 8%
GOOSEBERRY 6%
BLACK CURRANT 4%
WEEPING WILLOW 4%
GREY WILLOW 2%
HORNBEAM 2%
LILAC 2%
LIME 2%
PURGING BUCKTHORN 2%
SPINDLE 2%
total count
Differential sp. count

Table 247.47 – Combination table for Dunnington phase 4.

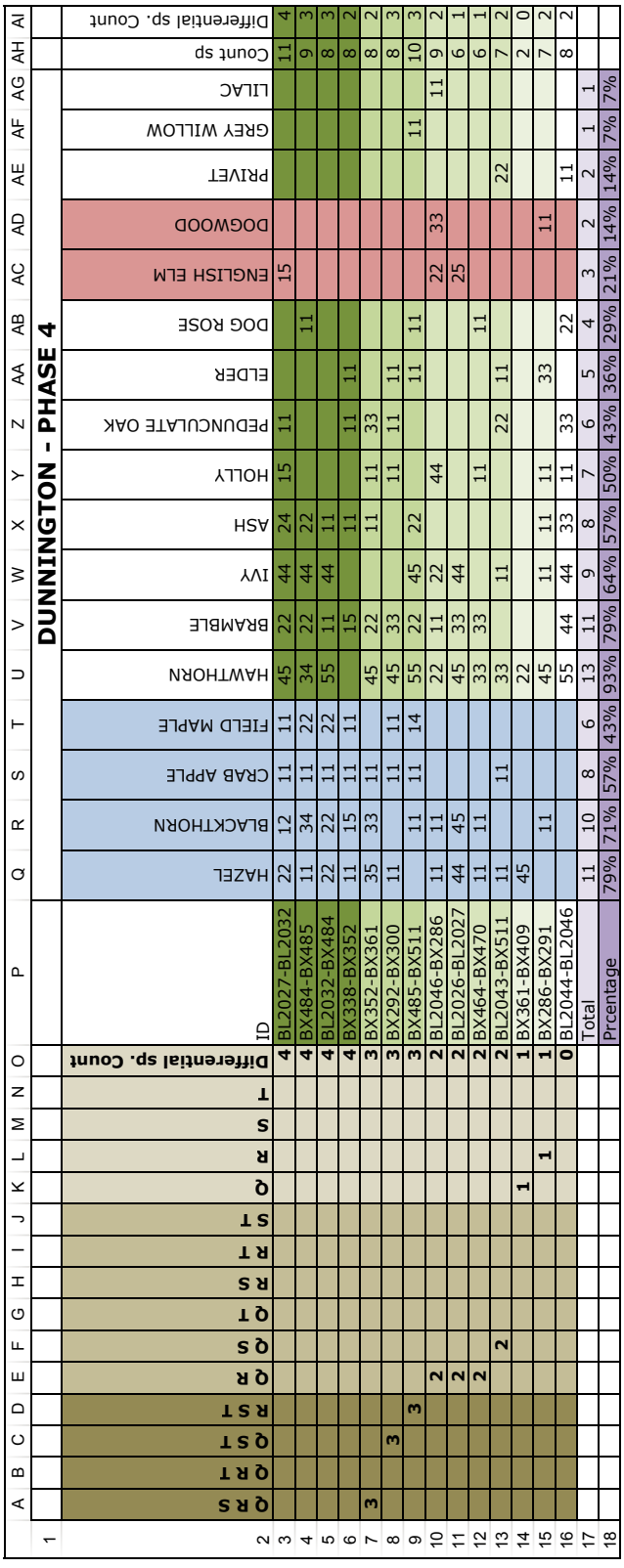


Table 248.48 – Combination table for Dunnington phase 5.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1								**DUNNINGTON - PHASE 5**																
2	ID	HAWTHORN	BRAMBLE	ASH	DOG ROSE	PEDUNCULATE OAK	ALDER	CRAB APPLE	ELDER	GREY WILLOW	DAMSON	ENGLISH ELM	HAZEL	BLACKTHORN	DOMESTIC APPLE	FIELD MAPLE	GUELDER-ROSE	HOLLY	SILVER BIRCH	SYCAMORE	WEEPING WILLOW	Count	Differentil sp. Count
3	CC560-CC564	44	22		22	33			11	22				33	11							8	
4	CC580-CC610	55	33		22	11	11	22			11		11									8	
5	CC552-CC580	55	33	11	33	11				11						11						7	
6	CC552-CC557	44	33	11	11				11				11									6	
7	CC626-CH135	33	33	22		22				22										45		6	
8	CC557-CC560	44	22	22		11											11					5	
9	CC599-CC637	55	11		11			11													11	5	
10	CC610-CC626	55						22			11							11				4	
11	CH172-CH178	35	11	11								45										4	
12	CH137-CH172			11					11			55										3	
13	CF650-CF654						11												11			2	
14	CF648-CF649						11															1	
15	CF649-CF650						11															1	
16	Total	9	8	6	5	5	4	3	3	3	2	2	2	1	1	1	1	1	1	1	1		
17	Percentage	69%	62%	46%	38%	38%	31%	23%	23%	23%	15%	15%	15%	8%	8%	8%	8%	8%	8%	8%	8%		

Table 249.49 – Combination table for Dunnington phase 6.

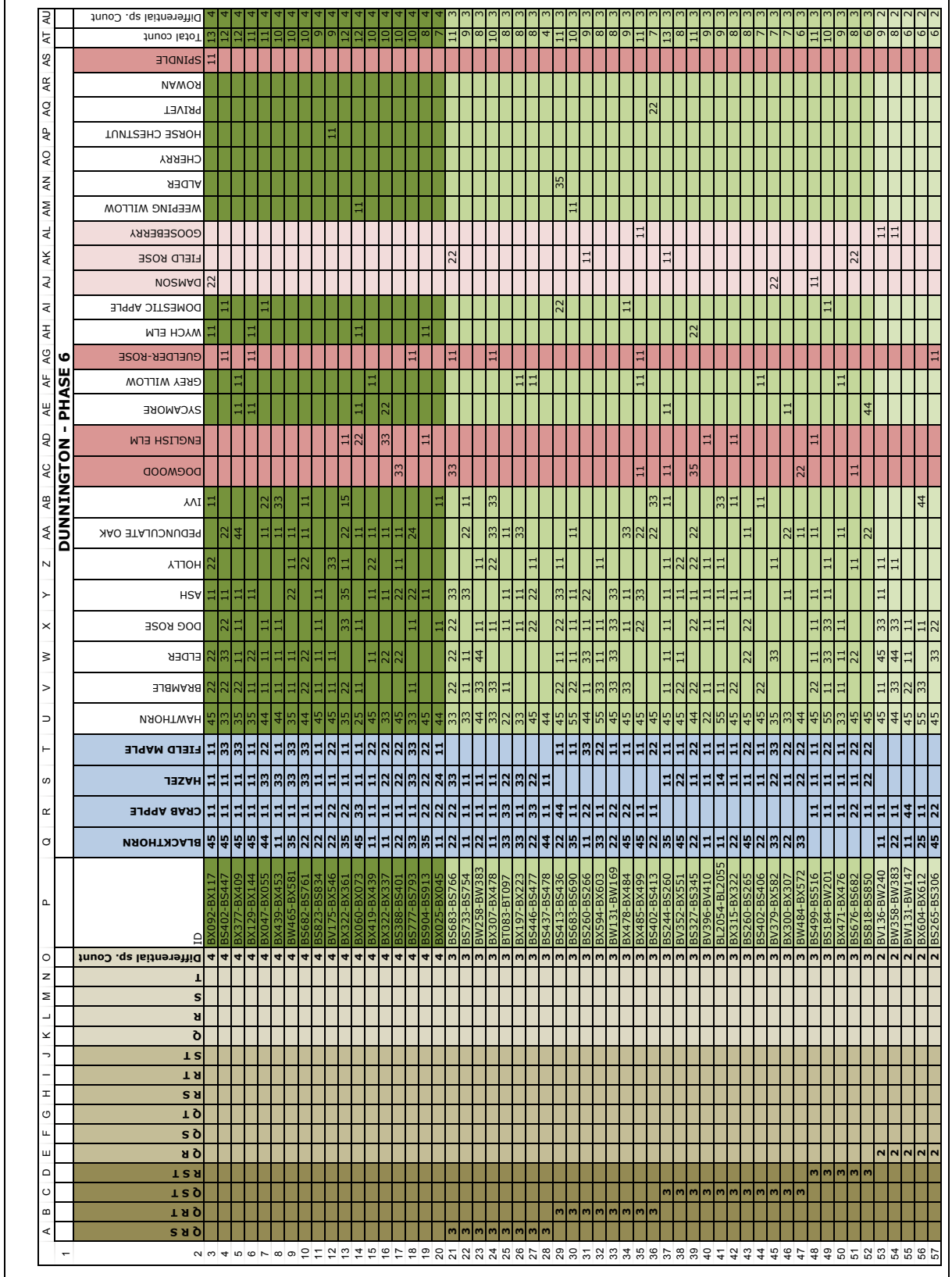


Table 249.49 – Combination table for Dunnington phase 6.

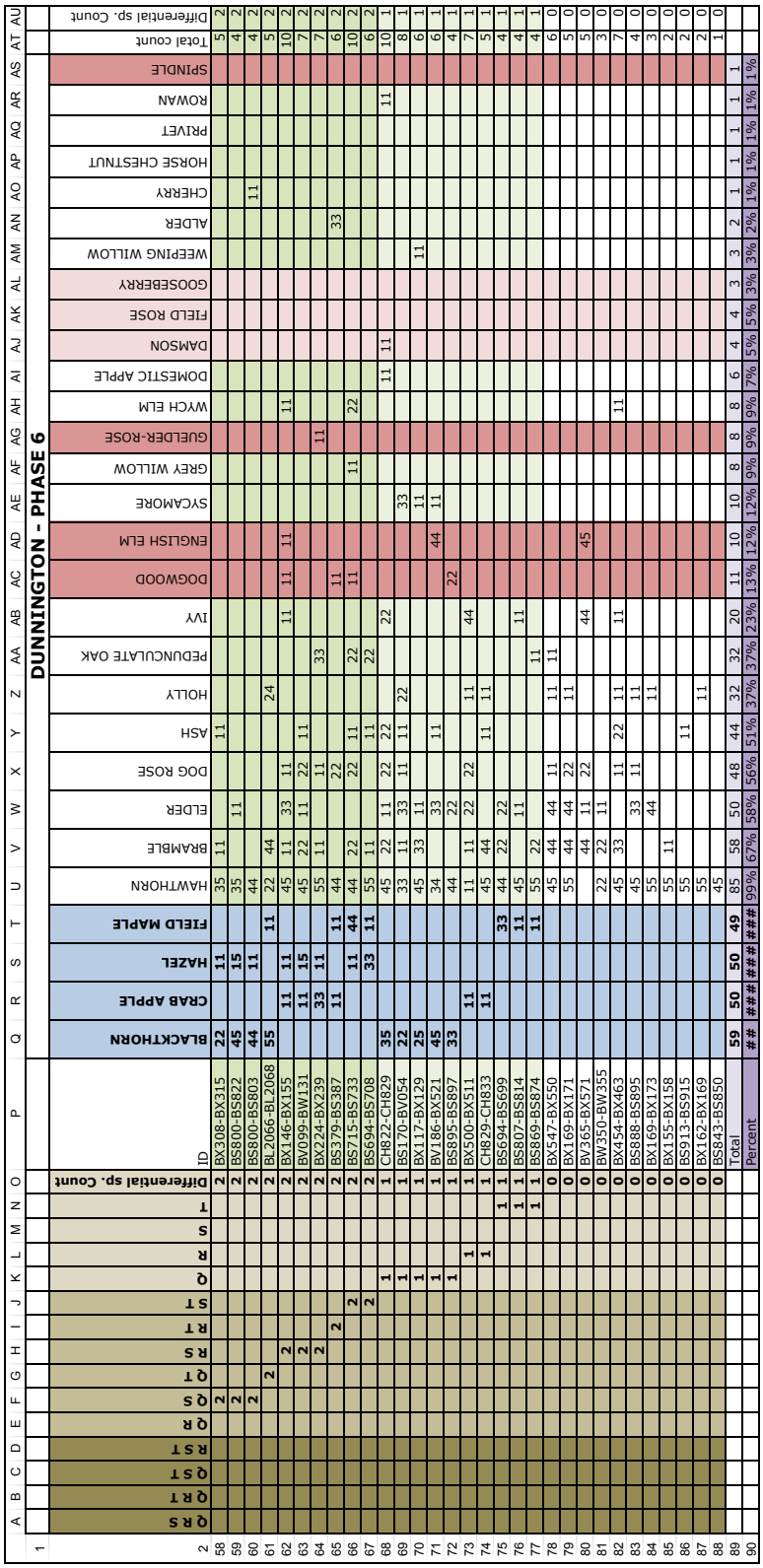


Table 251.50 – Combination table for Dunnington phase 7.

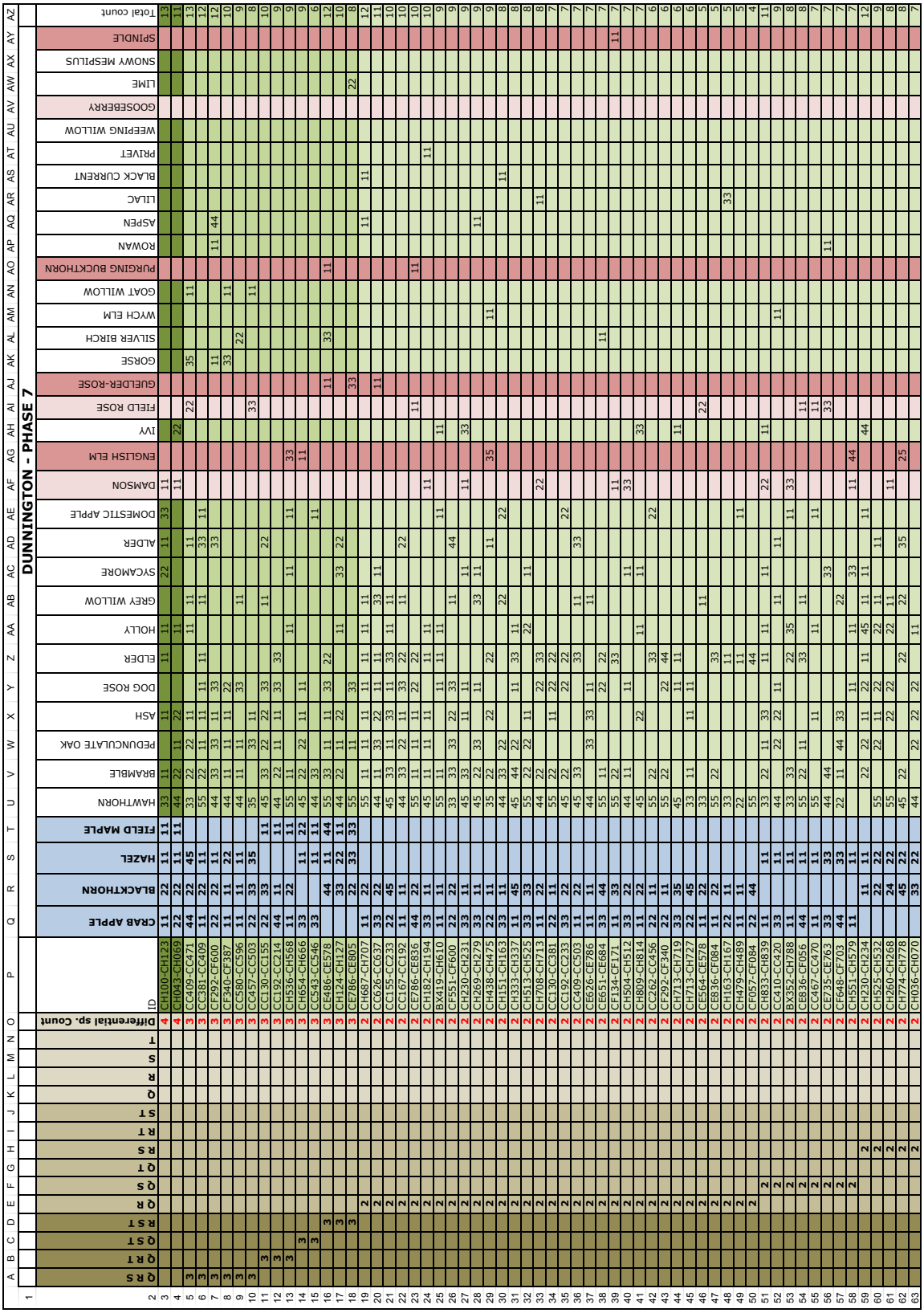


Table 251.50 – Combination table for Dunnington phase 7.

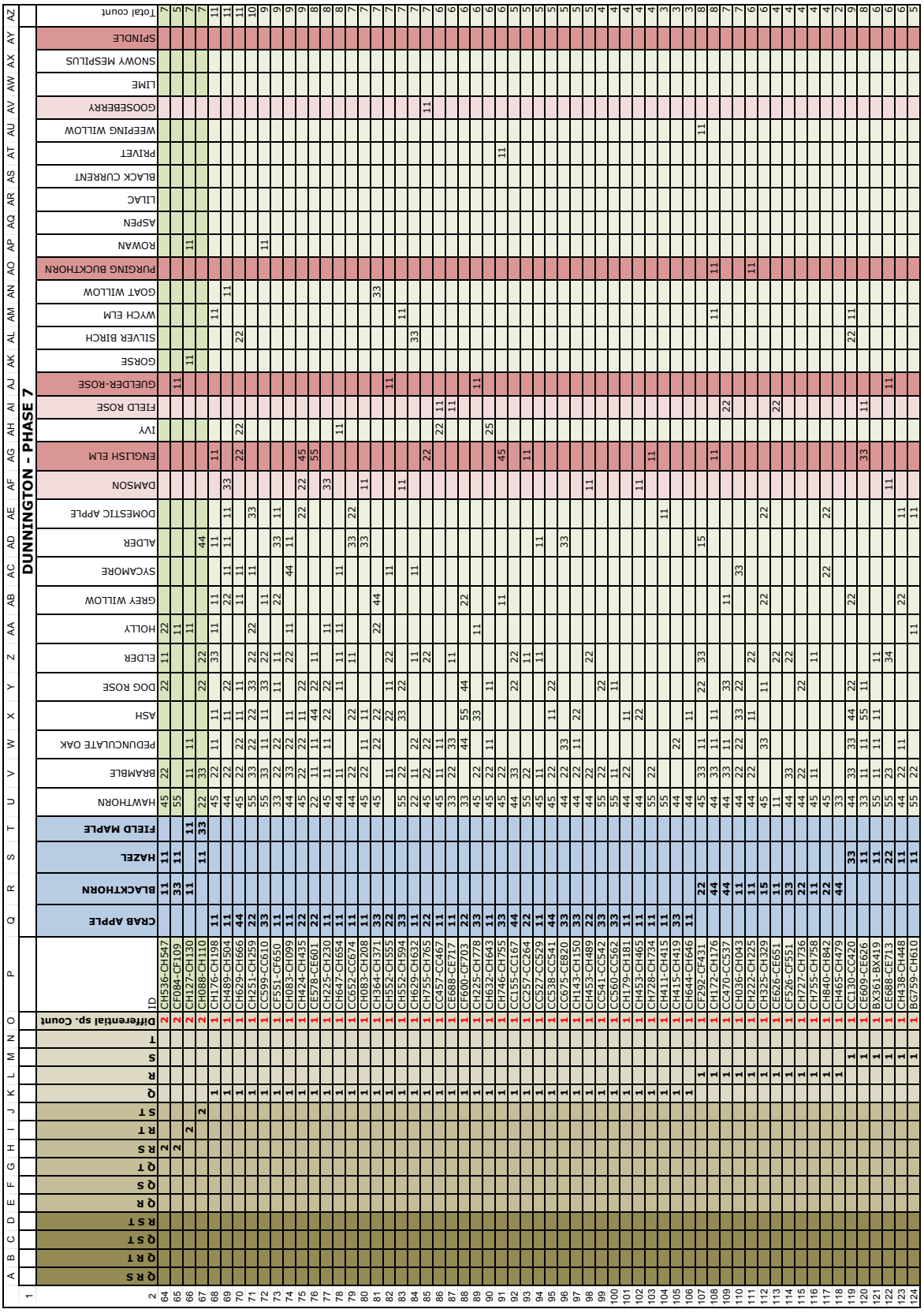


Table 251.50 – Combination table for Dunnington phase 7.

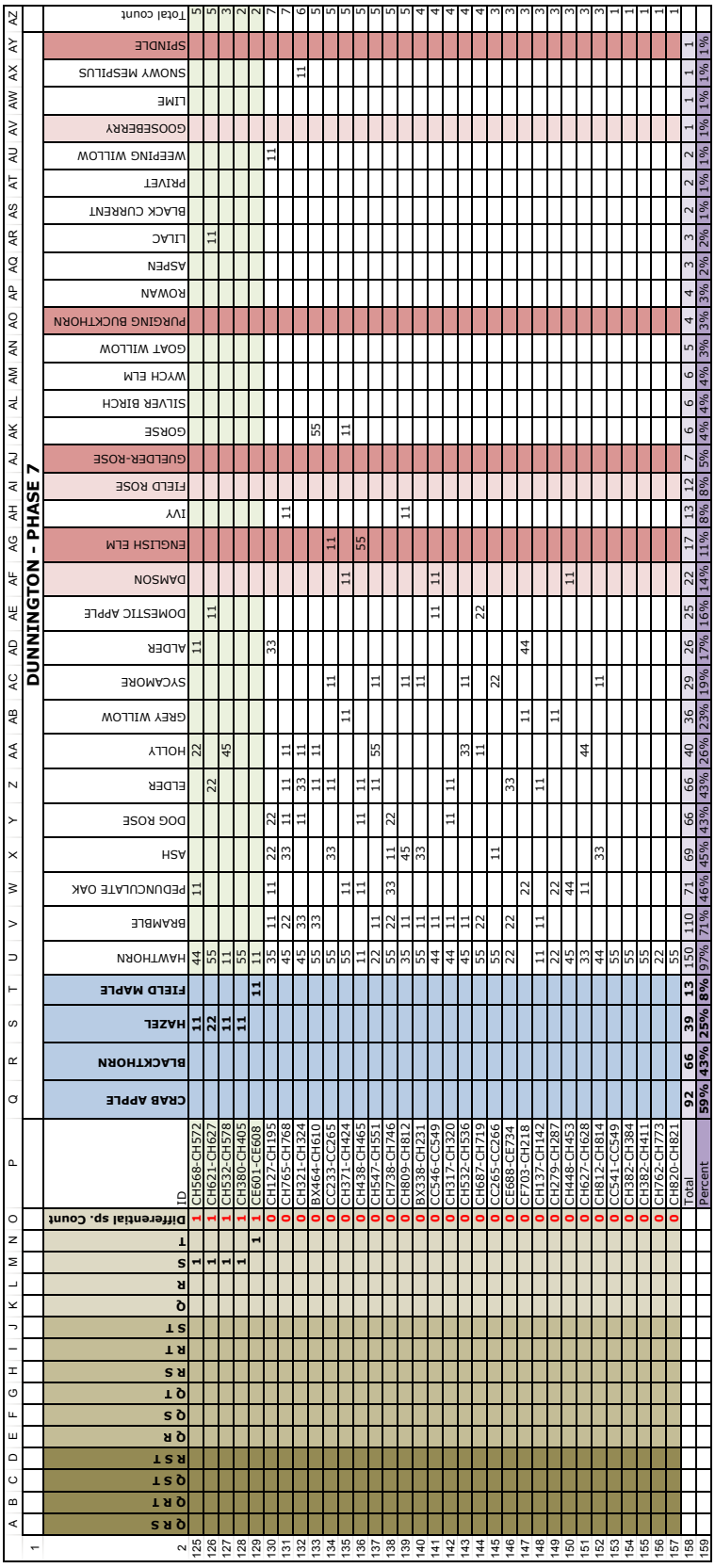


Table 254.51 – Combination table for Dunnington modern.

	ID	DUNNINGTON - MODERN																							
		HAWTHORN	BRAMBLE	ELDER	BLACKTHORN	CRAB APPLE	PEDUNCULATE OAK	DOG ROSE	SYCAMORE	ASH	ASPEN	GREY WILLOW	IVY	DOMESTIC APPLE	FIELD MAPLE	FIELD ROSE	GORSE	HAZEL	HOLLY	PURGING BUCKTHORN	SILVER BIRCH	WEEPING WILLOW	Count
	ID	33	33	11		11	44		22		11	22		11			11			11	11		12
	CH287-CH300	45	11	33	33	11		11	22	11									11				9
	BX158-BX173	45	33	11	45								11			11		11				22	8
	BS803-BS818	55	11		11	11	11			11			35										7
	BX001-BX197	44	22				44		22		22	11											6
	CH287-CH299	55		11		22		11						11									5
	BS379-BS447	55			11		22	11															3
	BX158-BX195	55	22			11																	3
	CH135-CH137	55		11																			2
	BL2053-BX286	55																					1
	BS874-BX180	55																					
	Total	10	6	5	4	4	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	
	Percent	100%	60%	50%	40%	40%	40%	30%	30%	20%	20%	20%	20%	10%	10%	10%	10%	10%	10%	10%	10%	10%	

Table 255.52 – Combination table for Grimston phase 1.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1		**GRIMSTON - PHASE 1**																
2	ID	HAWTHORN	ASH	BLACKTHORN	DOG ROSE	ELDER	BRAMBLE	CRAB APPLE	HAZEL	PEDUNCULATE OAK	SYCAMORE	ENGLISH ELM	FIELD MAPLE	FIELD ROSE	GREY WILLOW	GUELDER-ROSE	IVY	Total count
3	CE520-CE563	55	33	14	11	11	22	22		22	33			33				10
4	CC002-CC020	33		22	11	11		11	11						11	11	11	9
5	CC267-CC294	55	22	22	11		22		11	11		22	22					9
6	BV229-BV245	45	33			33												3
7	CE190-CE202	33	11								33							3
8	Total	5	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	
9	Percent	###	80%	60%	60%	60%	40%	40%	40%	40%	40%	20%	20%	20%	20%	20%	20%	

Table 256.53 – Combination table for Grimston phase 3.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		**GRIMSTON - PHASE 3**												
2	ID	HAWTHORN	BLACKTHORN	BRAMBLE	ELDER	DOG ROSE	ASH	CRAB APPLE	HAZEL	PEDUNCULATE OAK	FIELD MAPLE	HOLLY	SYCAMORE	Total count
3	CE270-CE284	33	33		11	11	11		11	11		11		8
4	CE288-CE311	44	22	22		11	11		11	11				7
5	BV246-BV258	45		22	22			11					33	5
6	CC032-CC043	55	55	11	22			11						5
7	CE234-CE268	55	33	22	11	33								5
8	CC007-CC032	11	55								44			3
9	CE140-CE145	11	44	11										3
10	Total	7	6	5	4	3	2	2	2	2	1	1	1	
11	Percent	100%	86%	71%	57%	43%	29%	29%	29%	29%	14%	14%	14%	

Table 257.54 – Combination table for Grimston phase 4.

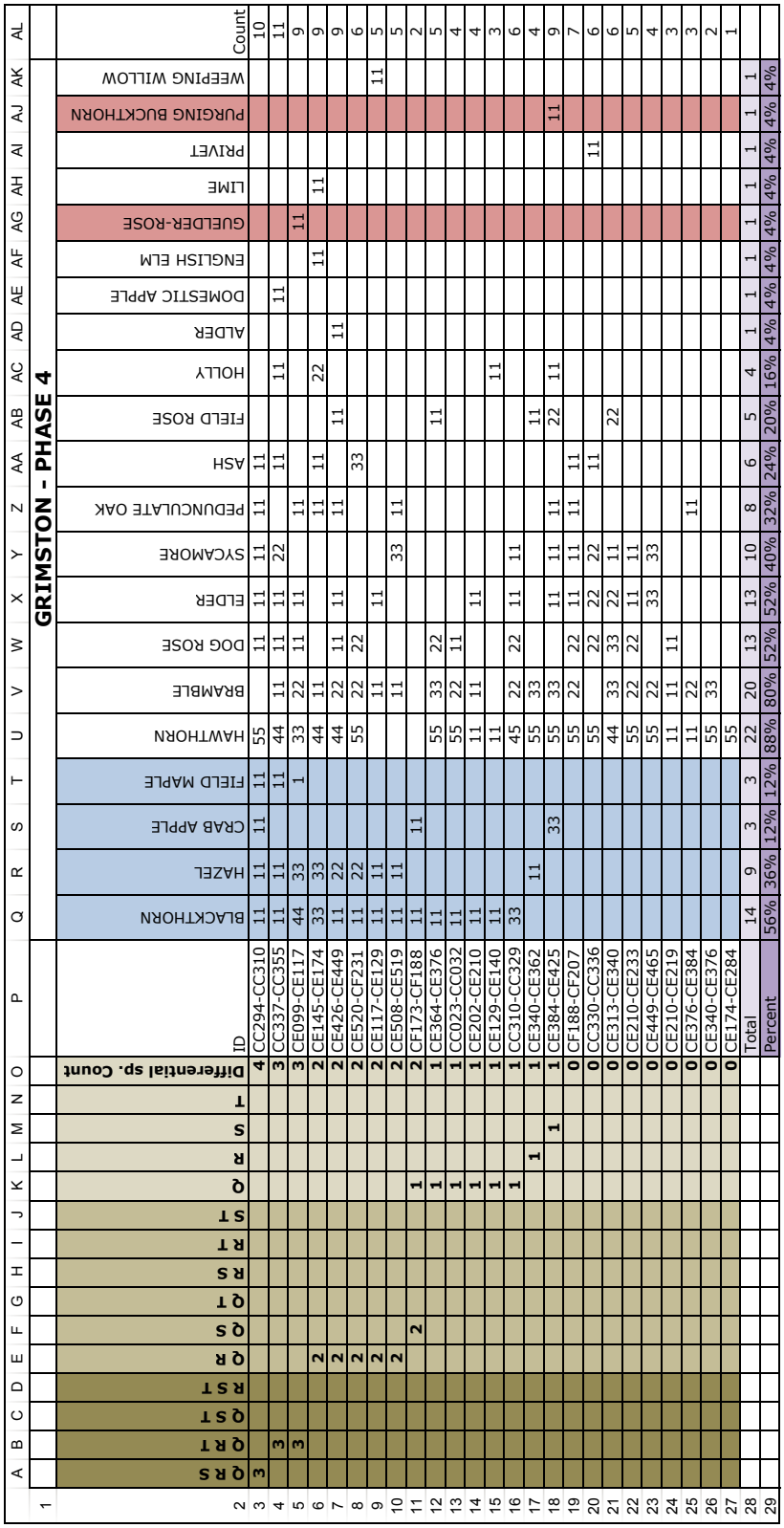


Table 258.55 – Combination table for Grimston modern.

	A	B	C	D	E	F	G	H	I	J
1		**GRIMSTON - MODERN**								
2	ID	CRAB APPLE	DOG ROSE	ELDER	HAWTHORN	ASH	BLACKTHORN	BRAMBLE	ENGLISH ELM	Total count
3	CE084-CE099	11		11	11	11	11			5
4	CE077-CE084	11	11		22				55	4
5	CE099-CE190		11	11				11		3
6	Total	2	2	2	2	1	1	1	1	
7	Percent	67%	67%	67%	67%	33%	33%	33%	33%	

Table 259.56 – Combination table for Total list.

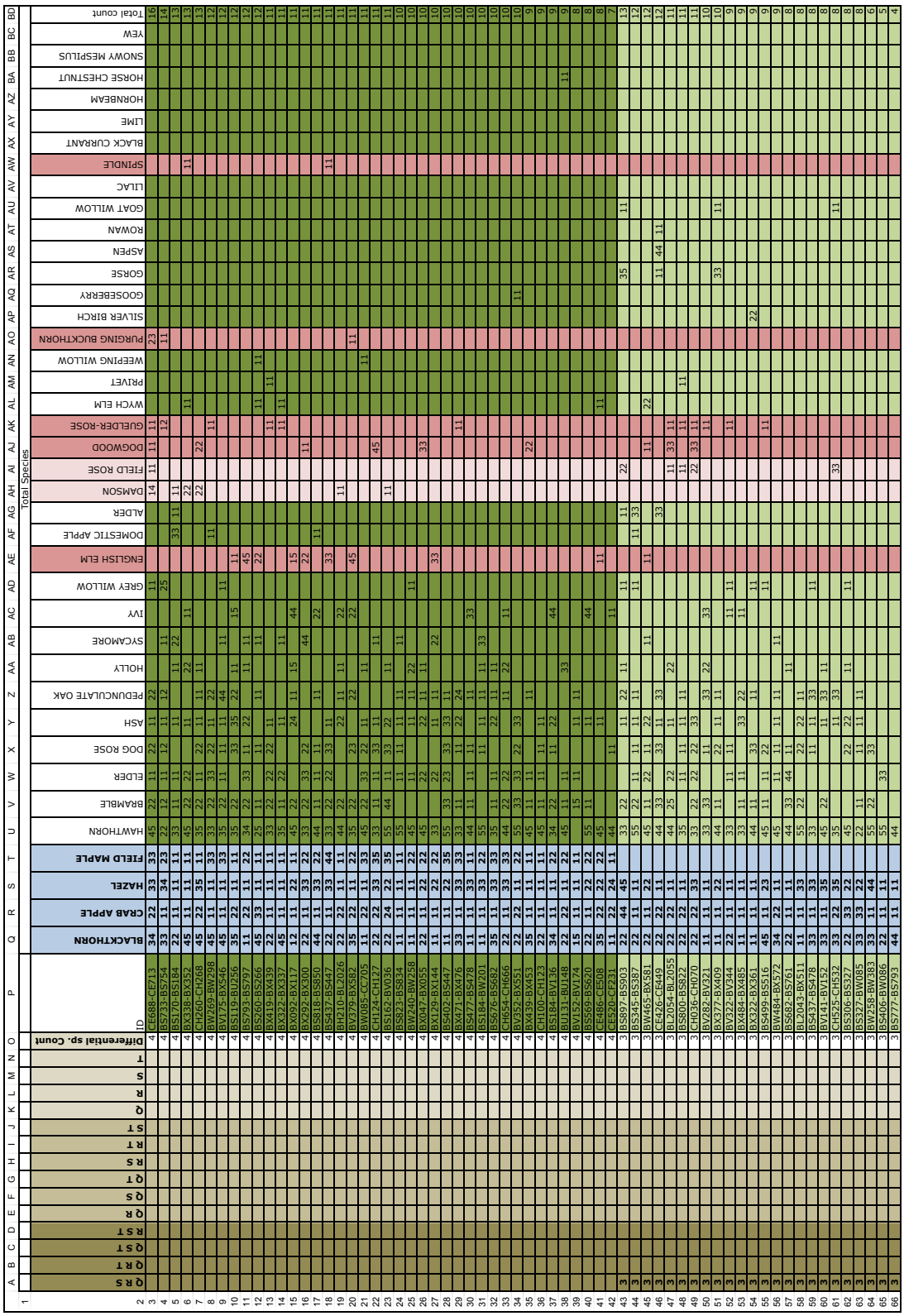


Table 259.56 – Combination table for Total list.

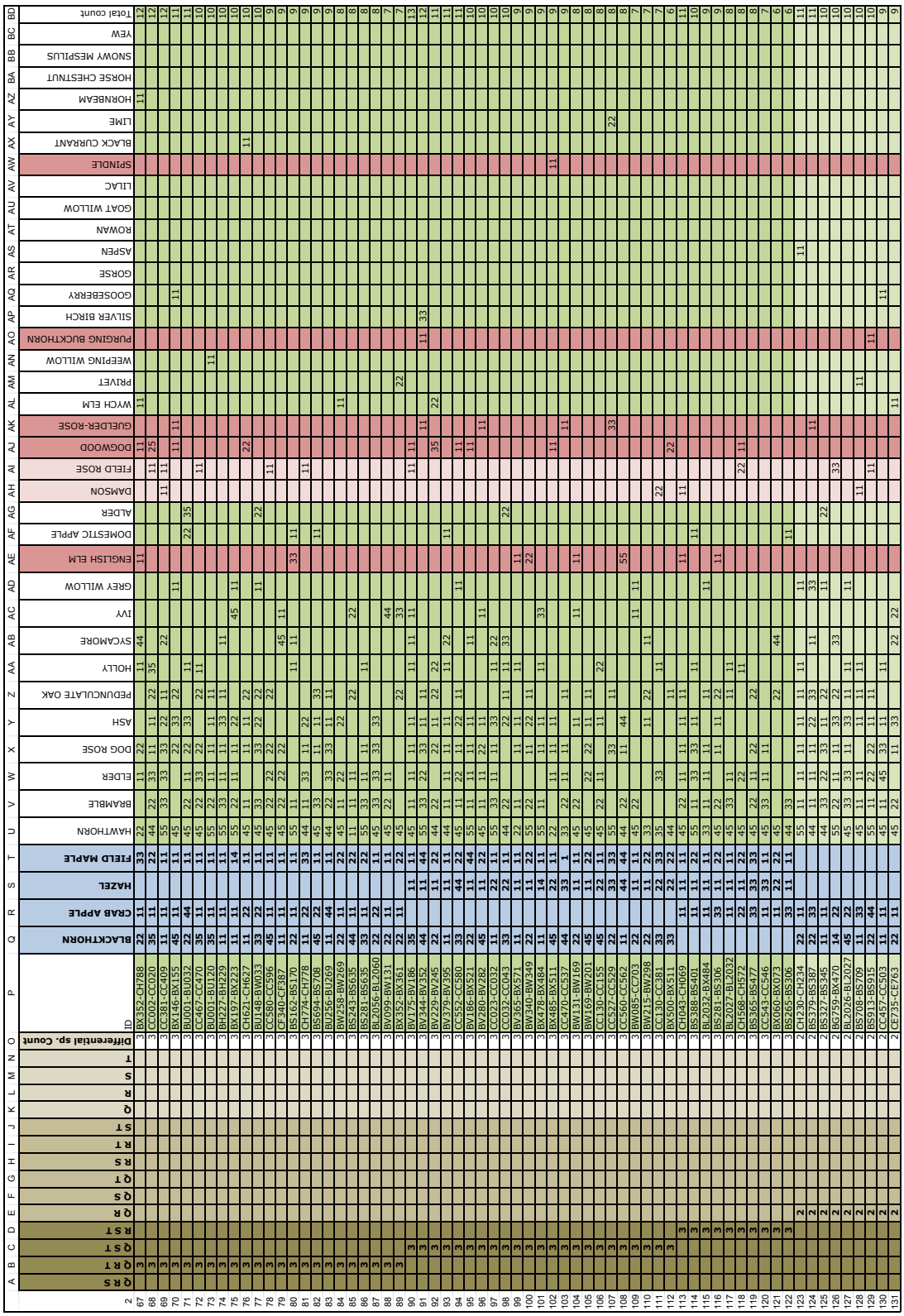


Table 259.56 – Combination table for Total list.

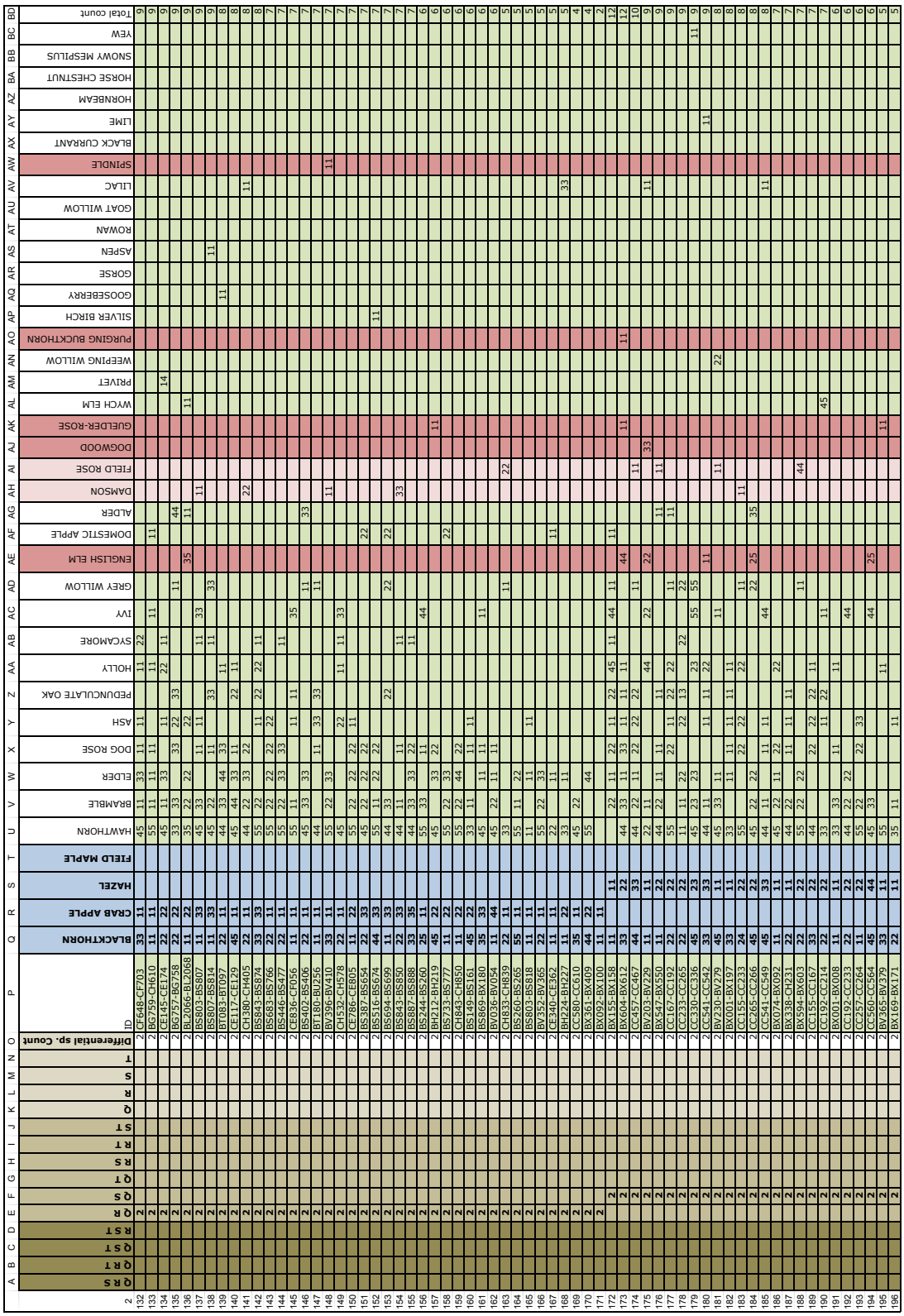


Table 259.56 – Combination table for Total list.

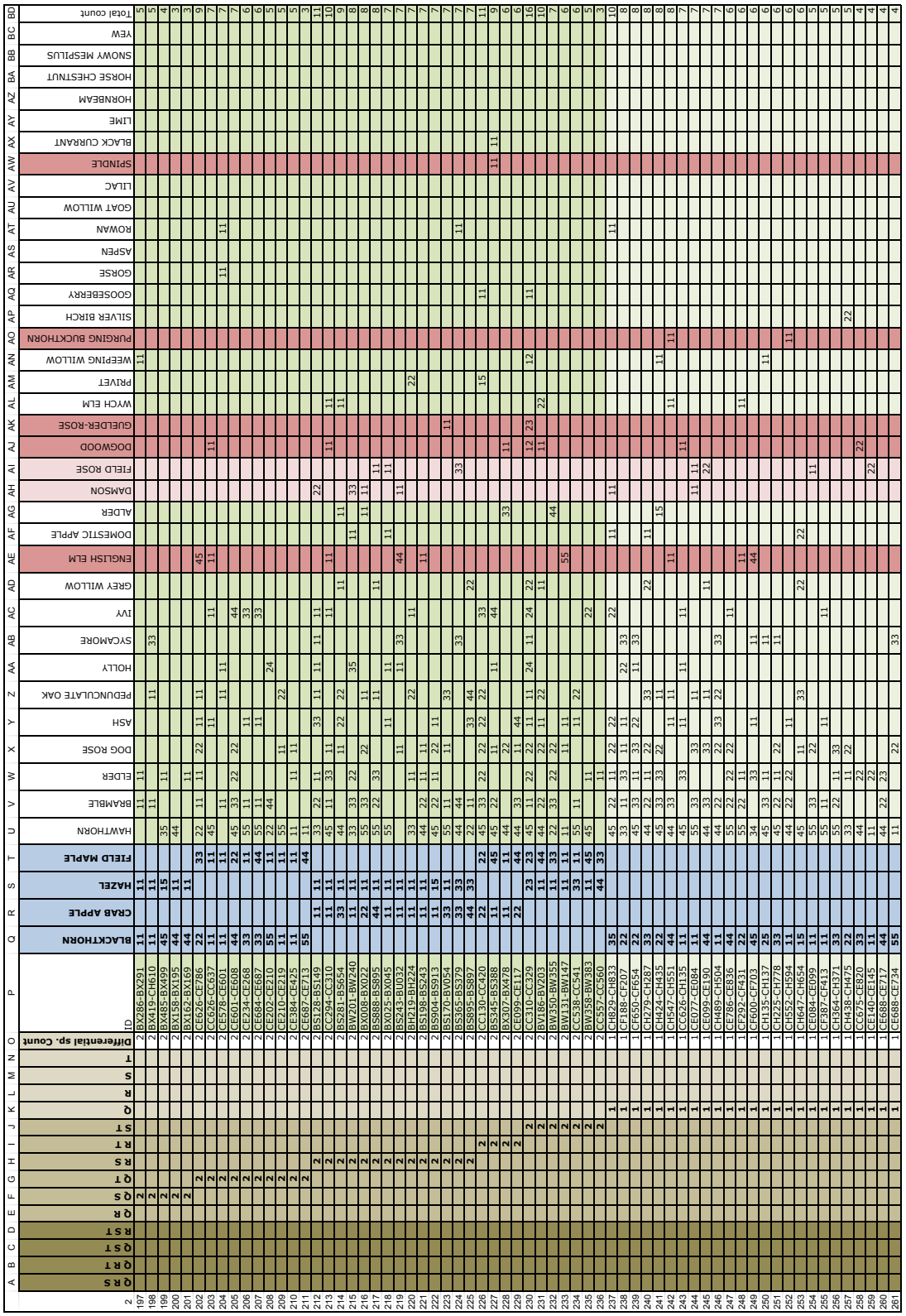


Table 259.56 – Combination table for Total list.

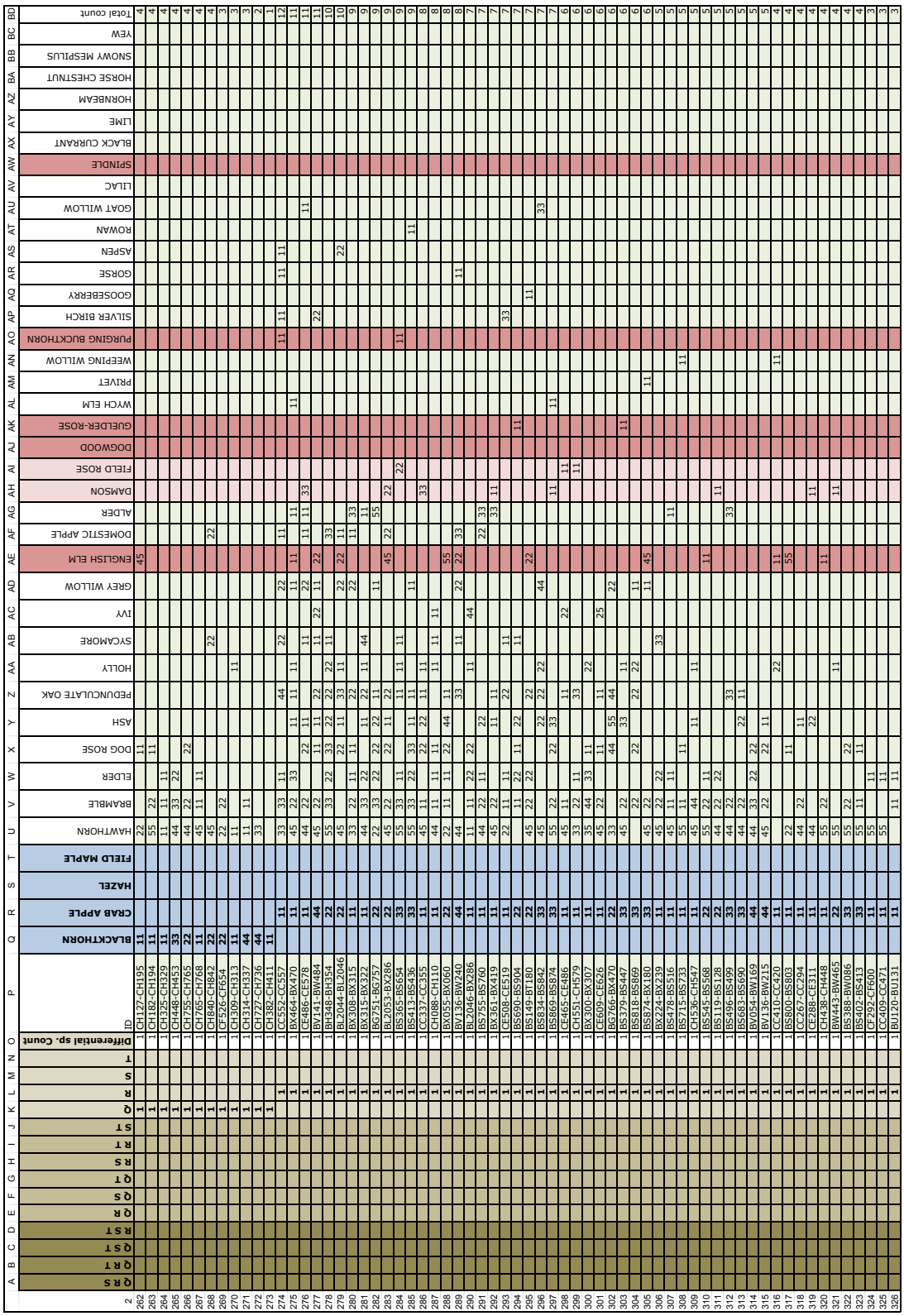


Table 259.56 – Combination table for Total list.

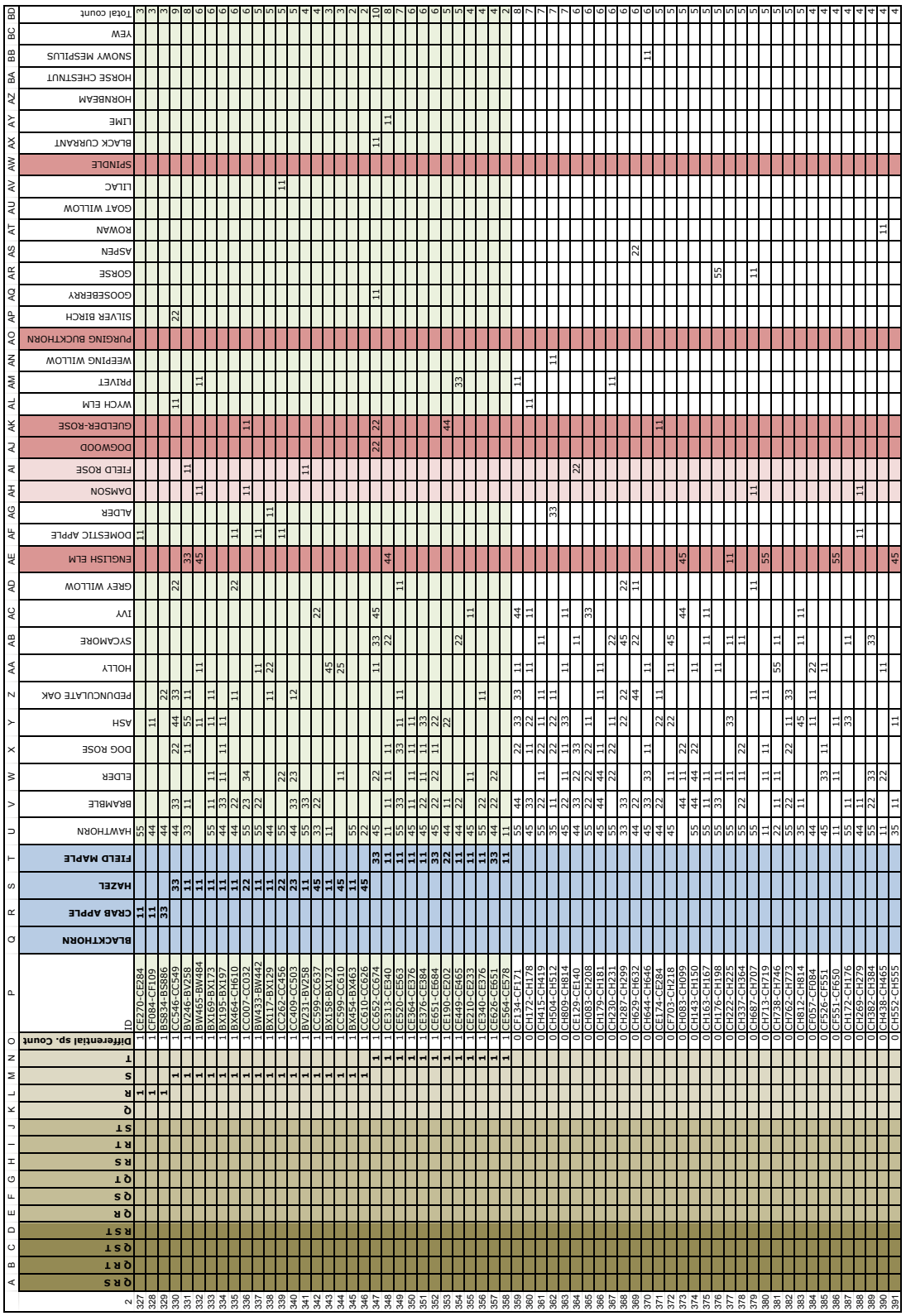
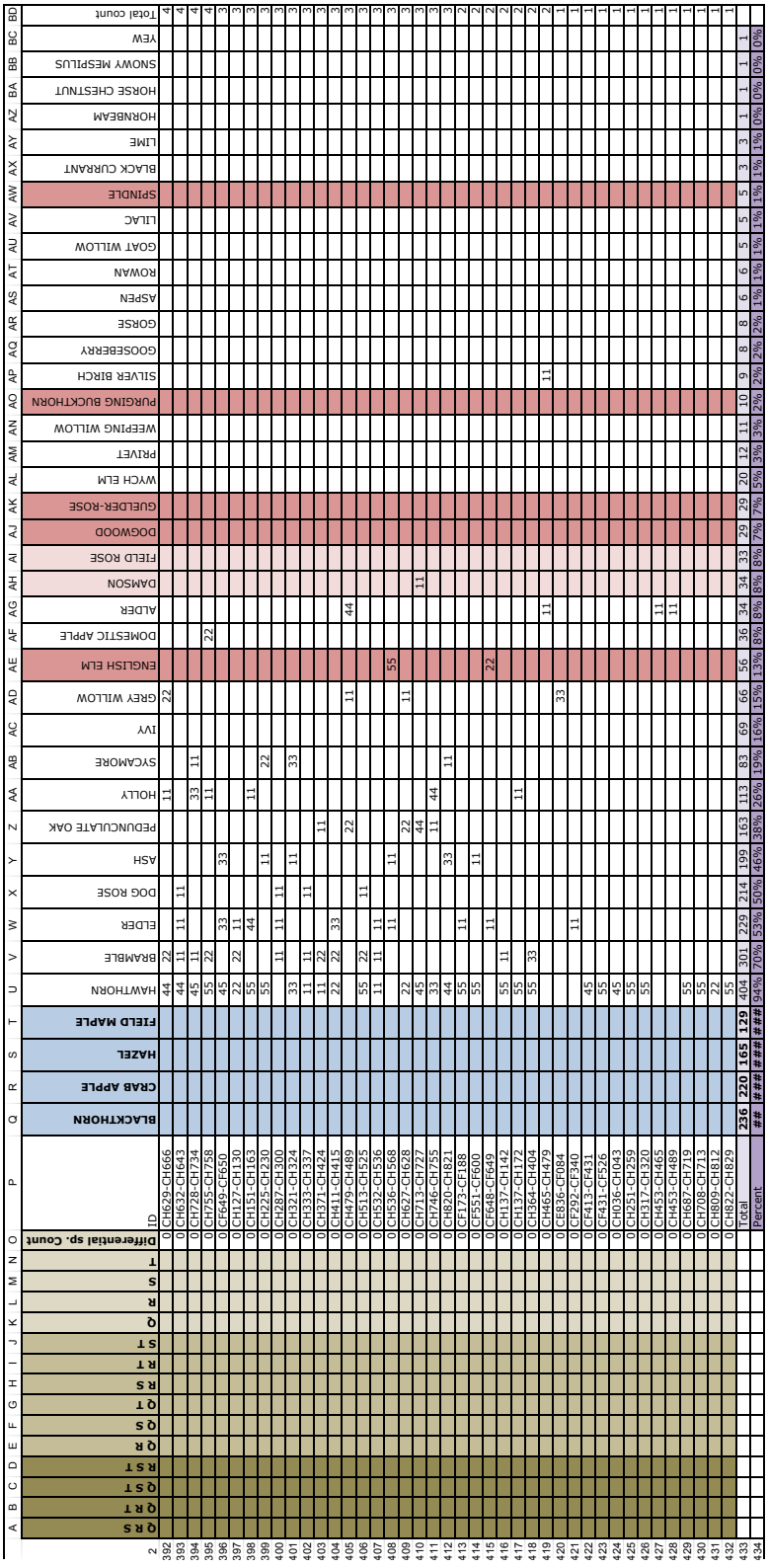


Table 259.56 – Combination table for Total list.



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