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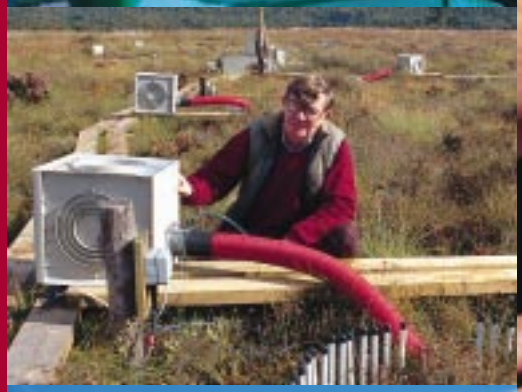

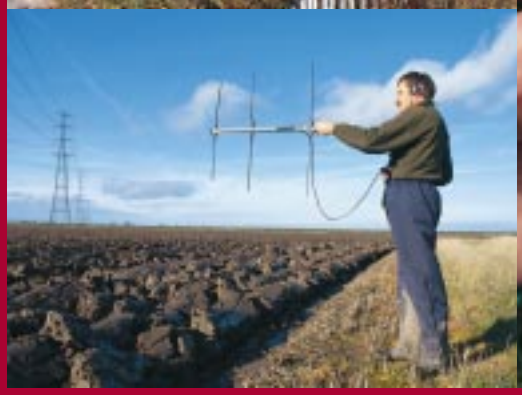

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The biodiversity of three traditional orchards within the Wyre Forest SSSI in Worcestershire: a survey by the Wyre Forest Study Group

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Cover note

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The views in this report are those of the authors and do not necessarily represent those of English Nature

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Contributors

The Wyre Forest Study Group

The Wyre Forest Study Group (WFSG) was established in 1991 to bring together persons who are interested in studying the natural history of Wyre Forest. It is the aim of the group to be a significant authority on the flora and fauna of the Forest and thereby provide advice and information to educational and planning authorities and environmentalists. Its members comprise both professional and amateur naturalists with interests covering a broad range of the biological and earth sciences. Besides the regular membership, non-members (referred to in this report as "associates") are welcomed and encouraged to work with members on projects in which they have a special interest or expertise.

Acknowledgements

Particular thanks are due to Dr Cedric Quayle, owner of Bowcastle Farm, for his generous co-operation and interest throughout the project. He kindly allowed recorders access to his delightful property at all times of the day and night without complaint! John Bingham (member of the WFSG and Conservation Officer for Worcestershire in English Nature) was responsible for initiating the project, providing liaison with English Nature and giving advice throughout. English Nature provided some financial support towards the costs of carrying out the recording and production of the report but the work was largely carried out by members and associates of the WFSG in their own time. The results are a testament to their dedication and hard work.

The fieldwork forming the basis for this report was carried out by WFSG members and associates. However, many other people also provided assistance in various ways, particularly in the identification of invertebrate specimens.

Many Wyre Forest Study Group members rose to the challenge of collecting records and they were rewarded with some excellent days out in the field. They were Mike Averill, David Barnett, John and Denise Bingham, Mick Blythe, Patrick Clement, Harry Green, Pat and Frank Lancaster, Kevin McGee, John Meiklejohn, Mervyn and Rosabelle Needham, Joy Ricketts, Malcolm Smart, Brian Stephens, Geoff Trevis, Rosemary Winnall, David Barnett and Paul Wright.

Additional biological recorders (WFSG Associates) from across the Midlands and beyond came in to help with recording, providing expert advice: Brian Sage (Coleoptera), Patrick Clement (Lepidoptera), Dave Grundy (Lepidoptera), Mark Lawley (Bryophyta), John Partridge (Arachnida), Alan Prior (Lepidoptera), Craig Round (Lepidoptera), Adrian Uren (Mammalia).

One person in particular who put very many hours into the project deserves a special mention. Mick Blythe took on the onerous task of collecting and sorting all the malaise trap material weekly throughout the year. His dedication and extraordinary commitment resulted in many records from this source over a wide range of taxa. John Meiklejohn received enormous amounts of malaise trap material. His enviable ability to identify a range of different groups was much appreciated, and he has contributed many records.

National experts were called upon to check records and to identify specimens, namely, Dr Michael Archer (Aculeate Hymenoptera), Peter Chandler (Diptera), Jonathon Cole (Diptera), Dr. Tony Simpson (Micro-lepidoptera), Paul Whitehead (Coleoptera), Dr Gavin Broad (Parasitic Hymenoptera), Dr Guy Knight (Symphyta), and Dr M. Shaw (Parasitic Hymenoptera). We thank them for giving their time and knowledge so willingly. Peter Chandler especially, spent very many hours at the microscope identifying fungus gnats. Dr Peter Skidmore performed invaluable work under an English Nature contract to sort and identify material from some malaise trap samples.

Rosemary Winnall, with help from Patrick Clement for moth records, set up the initial spreadsheet of records as they were submitted. At a later stage Malcolm Smart developed and maintained the database of records used to create the tables and statistics quoted in this report and Mike Bloxham provided a great deal of assistance in resolving issues relating to the data set such as inconsistencies in scientific species names.

A special mention must be made of John Bingham and Brian Stephens who contributed large sections of the text. John Bingham wrote the botanical habitat survey and fungi section, and Brian Stephens contributed the brief history of the site. He went on to write the tree audit and to research the history of the site and obtain identifications of the fruit where possible. He developed the orchard tree scale of vitality index which has become an interesting part of this report. Both persons helped put together the landscape setting section and description of the orchards. Several other Study Group members helped with information, statistics and sections of text.

A number of orchard experts are to be thanked for their help with the compilation of the tree data and the history of the area, namely: Mr. N. Winney, Head Gardener, Berrington Hall and custodian of the Fruit Collection for help with apple identification; Mrs. Sheila Leitch, Network Co-ordinator, and other members of the Marcher Apple Network, who spent a lot of time identifying numerous samples of apples; Professor Basil Jarvis and Dr. Murray Mylechreest for providing valuable information.

Thanks are also due to staff of Bewdley and other Branches of Worcestershire County Library, for assistance in obtaining books not normally in circulation and to staff at the Worcestershire County Record Office and History Centre, and particularly Deborah Oliver at the Worcestershire Historic Environment and Archaeology Service for help with maps and aerial photographs. Dr Heather Robertson of English Nature provided comments on the final draft of the report and Ian Langford kindly checked bibliographic references.

Without all this generous help from so many people the study would not have been accomplished!

Summary

Traditional orchards and their associated habitats support a wide variety of wildlife. However there have been very few systematic studies of the biodiversity of such orchards. To help fill this gap, English Nature set up a project in 2004 to review the extent, distribution, biodiversity and management of traditional orchards in England, and included in the project some selective orchard surveys. In parallel with this project, and with support from English Nature, the Wyre Forest Study Group undertook a separate survey of the fauna and flora of three traditional orchards forming part of Bowcastle Farm, which is situated on the edge of the Wyre Forest in the county of Worcestershire. The Wyre Forest Study Group is a local natural history and conservation group with broad technical expertise across a wide range of taxonomic groups.

The aim of the survey was to demonstrate the range of biodiversity that orchards managed in a sympathetic manner can support. While the English Nature study concentrated on habitat recording, and selective recording of lichens, bryophytes, fungi and invertebrates, the members of the Wyre Forest Study Group carried out species recording in greater depth and over a much wider range of taxa. Their comprehensive survey of three traditional orchards is the first of its kind in the UK and is thus of unique importance in understanding the biodiversity of the orchard habitat.

Bowcastle Farm is set in a mixed pastoral and wooded landscape with numerous cherry orchards. These formerly supplied fruit to the Birmingham area. However, the fruit trade has declined over the years and many orchards in the area have been lost. Most of those that remain, including those at Bowcastle Farm, are now not used for fruit production and have been retained for landscape or wildlife reasons. The Bowcastle Farm orchards all lie within the Wyre Forest Site of Special Scientific Interest and have been entered by the owner into the Countryside Stewardship Scheme.

The three orchards surveyed by the Wyre Forest Study Group are called Cherry Orchard, Old Orchard and Far Orchard and together cover an area of 5.39 hectares. A census of the mature fruit trees showed that Cherry Orchard had 77 cherry trees and 2 apple trees, Old Orchard had 28 pear trees and 9 apple trees, while Far Orchard had 82 cherry trees, 44 apple trees and 18 damson trees. A total of 27 different varieties of fruit were identified. A novel way of recording condition of the trees was developed by Brian Stephens during the survey and the results showed that most trees were in the later stages of life and had abundant veteran tree features such as hollow trunks or fissured bark.

The grand total of 1,868 species of wild plants and animals was recorded from the orchards, including vascular plants, bryophytes, fungi, lichens, vertebrates, and invertebrates. During the study a total of 6,353 individual records were collected, based on sightings and /or examination of more than 16,900 specimens.

The habitats available to this great variety of species comprised orchard floor and boundary habitats as well as the fruit tree habitats. The orchard floor in all three orchards was permanent grassland grazed by cattle. Generally, the grasslands were relatively species-poor in terms of vascular plants, but patches of grassland were found to be more species-rich, especially in Cherry Orchard, being closest in type to the Biodiversity Action Plan (BAP) priority habitat of Lowland Meadow. A particularly important feature of the grassland was

the presence of assemblages of waxcap fungi. These were notably diverse in Cherry Orchard, where 12 species of *Hygrocybe* were recorded, including the priority BAP species *Hygrocybe calyptriformis*. The historical evidence compiled for the orchards suggests that Cherry Orchard had the oldest grassland, being noted as orchard under grass in 1870, whereas much of the site of Old Orchard was arable at that time, while the site of Far Orchard was still coppice woodland at that date.

The presence of cattle, the main grazers in the 'wood pasture' system of the orchards, supplied a potential dung habitat for a wide range of species. Analysis of species records across groups shows that at least 97 species (5% of the total) are strongly associated with dung. These include Fungi, Coleoptera, Diptera and a Dermapteron (earwig). The extent to which these species were associated with dung produced by the wild mammal fauna of the area (deer, birds, small mammals) rather than that produced by the grazing cattle is unclear, but during the grazing season the mass of cattle dung available must have vastly exceeded that produced by wild species.

A total of 12 blood-sucking species was recorded (all Diptera). As with the dung species, there must be some uncertainty as to whether the wild mammal or bird species provide the food source or whether the association is with the cattle which regularly graze the orchards.

The high number of orchard trees with well-developed veteran tree features provided an abundance of wood-decay habitats for specialist species which depend upon them (saproxylic species). A total of 224 species (12% of the total) known to be dependent on, or regularly associated with, dead wood were recorded including Fungi, Diptera, Coleoptera, Hymenoptera, and Lepidoptera. The Diptera (126 species) were the largest group due to the presence of many species of fungus gnat (Mycetophilidae) which feed on fungi involved in the process of breaking down dead wood. Among the 50 Coleoptera species associated with wood-decay habitats (22% of the total number of Coleoptera) were 5 Indicators of Ecological Continuity (IEC), ie species thought to be associated with continuity of tree cover in the landscape through time. The species at Bowcastle Farm included 2 species with the strongest association with habitat continuity (graded IEC 1).

The abundance of old trees and wood-decay features had attracted a range of hole-nesting birds, including woodpeckers (*Dendrocarpus major*, *Dendrocarpus minor* and *Picus viridus*) and redstart (*Phoenicurus phoenicurus*). Far Orchard had the greatest number of woodpecker holes in the trees and much the highest number of woodpecker records.

The trees had only limited numbers of epiphytic bryophyte and lichen species, and no mistletoe was present. The relative paucity of the epiphytic lower plant flora may be related to the history of air pollution in the area.

The hedgerows, which formed the majority of the boundaries of the orchards, had a variety of woody species, qualifying them as priority BAP hedgerows. Woodland herbs such as *Teucrium scorodonia* (wood sage) and *Dryopteris felix-mas* (male fern) were also found in the hedgerows. The scrub habitat provided by the hedgerows was important for breeding birds such as dunnock (*Prunella modularis*), lesser whitethroat (*Sylvia curruca*) and wren (*Troglodytes troglodytes*).

The three orchards provided habitats used by a wide range of rare and threatened species. There were 5 priority BAP species present, with one representative each from the following

major taxon groups: fungi, invertebrates, amphibians, birds and mammals. The BAP waxcap fungus *Hygrocybe calyptriformis,* has already been mentioned above. *Gnorimus nobilis*, the noble chafer beetle, was found in Far Orchard. It is a saproxylic species, the larvae of which live in the heartwood of orchard fruit trees. The other 3 BAP species, great crested newt (*Triturus cristatus*), spotted flycatcher (*Muscicapa striata*, also a Red List bird) and pipistrelle bat (*Pipistrellus pipistrellus*), probably use the orchards as part of the mosaic of habitats they exploit; the newt for sheltering and foraging, the spotted flycatcher for feeding and possibly nesting and the pipistrelle bat for foraging activity.

Overall, as well as these priority BAP species, the orchards supported 56 nationally rare, nationally scarce or declining species including 2 Red List birds and 8 Amber List birds. The record for nesting lesser spotted woodpecker, *Dendrocarpus minor,* is interesting as it was noted for its association with old orchards in Worcestershire over 50 years ago. Recent research on the species in Germany indicates that orchards there are better quality breeding habitat for the species than deciduous woodland.

Invertebrates predominate in the list of rare and scarce species, in particular saproxylic species. Among the Coleoptera, twelve out of the 15 rare and scarce species are saproxylic (including *Gnorimus nobilis*), 9 out of 14 Diptera are saproxylic as are 4 out of 12 rare and scarce Hymenoptera, including *Lasius brunneus*, the brown ant. Of the 3 nationally scarce Lepidoptera, the larva of the waved black (*Parascotia fulginaria*) was found feeding on the fungus *Stereum hirsutum* growing on a dead log in Far Orchard. Other habitats within the orchard also supported rare and scarce species, such as 2 nationally scarce Hemiptera, *Amblytus brevicollis* and *Oliaris panzeri*, associated with the grassland, and the fly *Hydrotea meridionalis*, associated with dung. Predators and parasites also feature in the list, like the predatory two coloured mimic wasp, *Psen bicolor*, which feeds on leafhoppers and the wasp *Sapyga clavicornis* which is a parasite of the sleepy carpenter bee, *Chelostoma florisomne*, a saproxylic species.

Although the number of species recorded during the study was remarkably high, certain groups of invertebrates appear to have been under-recorded. Future work focussing on those groups could reasonably be expected to produce records of a significant number of additional species. The present survey was dominated by the success of the malaise trap program. A trapping program using devices oriented towards capturing species that the malaise traps missed should potentially add a substantial number of species to the list. Such devices would include pitfall traps, water traps, emergence traps and similar devices. The current study largely ignored the fauna of the soil and ground surface layer.

Some groups sampled during the survey were not actually reported on because of inability to the identify them within the time available for the project. These included large numbers of minute Parasitic Hymenoptera, Diptera and Microlepidoptera captured in the malaise traps.

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1 Introduction

1.1 Background to the study

Traditional orchards and their associated habitats support a wide variety of wildlife. However there have been very few systematic studies of the biodiversity of such orchards. To help fill this gap, English Nature set up a project in 2004 to review the extent, distribution, biodiversity and management of traditional orchards in England, and included in the project some selective orchard surveys. In parallel with this project, and with support from English Nature, the Wyre Forest Study Group undertook a separate survey of the fauna and flora of three traditional orchards forming part of Bowcastle Farm, which is situated on the edge of the Wyre Forest in the county of Worcestershire. The Wyre Forest Study Group is a local natural history and conservation group with broad technical expertise across a wide range of taxonomic groups.

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A preliminary report was produced for English Nature by the WFSG in February 2005 before identification of all the insect samples obtained in the field could be completed. The present report, incorporating the final data set, provides a final analysis of all available survey data.

1.2 Organisation of the report

The report is a compilation of work by many individuals studying different aspects of the orchards and the biodiversity which they support. At the heart of the studies lies a database containing records and observations of species present in the orchards. To facilitate the presentation of the data extracted from the database and relevant analyses in a logical manner the sections of report are arranged broadly as follows:

- Outline of the background to the survey, the approach taken and data processing (sections 1 – 2)
- Information on the history of the orchards and their environment (section 3)
- Survey results for the habitats and fruit trees in each orchard (Sections 4 – 5).
- Species information summarised by taxonomic group based on the data recorded in the database (sections 6 – 22), comprising, where relevant, the following sub-sections:
    - descriptions the survey methods employed
    - summary statistics relating to numbers of species present and numbers of records
    - Notes on community associations or assemblages, eg saproxylic invertebrates
    - Lists and notes on each species with current UK conservation status or of special interest for other reasons

- Overall analyses, summary and conclusions (Section 23)
- Appendices listing the data collected, including a complete list of species recorded, the recorders and taxonomists responsible for each taxon group and maps showing the location and history of the orchards

2 Survey methods and data processing

2.1 Outline of the survey approach

The objective of the survey was to record as far as possible the total biodiversity found within, and associated with, the three Bowcastle Farm orchards. Because members of the Wyre Forest Study Group collectively have expertise in recording and studying most of the wildlife groups expected to be found in the orchards, no attempt was made to limit the scope of the study to any particular taxa. Efforts were made to record as many of the species present as possible during the effective study period available ie between February and November 2004. Some additional information on the fruit varieties was collected in 2005.

Any possible survey/sampling methods were used (following standard procedures where applicable) subject to the constraint that they should not cause damage to the habitat and to the orchard trees in particular.

Site surveys were made periodically by individual group members throughout the survey period at intervals consistent with obtaining realistic representative records of seasonal species, using mechanical aids such as hand nets for insects, mammal traps for small mammals, electronic bat detectors, and light traps (both actinic and mercury vapour models) for nocturnal insects (Lepidoptera in particular). Night survey visits were made at roughly monthly intervals to record nocturnal fauna (primarily moths and bats).

No attempt was made to systematically search for, identify and record immature stages of invertebrates, though a few Lepidoptera were recorded based on field identifications of their larvae.

Each of the three orchards was subject to both a detailed, standard English Nature botanical Phase II Grassland Survey and a full survey of the fruit trees present and their condition.

A Breeding Bird Survey was carried out in line with British Trust for Ornithology guidelines.

2.2 The invertebrate trapping programme

It was recognised that each member of the Study Group would have only a limited time available to spend in the field and that therefore the invertebrate survey in particular would have to be supplemented by a programme of continuous (unattended) trap sampling in order to achieve a reasonably complete record of the total fauna. Consideration was given to the use of malaise traps (flight interception traps), pitfall traps, water traps and emergence traps. In practice the presence of cattle grazing in the orchards placed severe limitations on types of traps and the siting of traps used because of damage through trampling and disturbance by cattle.

An emergence trap was ordered but it did not arrive in time to be used in the survey. Water traps proved to be impractical, both because of cattle trampling and because of the difficulty of moving sufficient quantities of water to the survey sites at frequent intervals. Pitfall traps were also disturbed by cattle. Use of these traps was discontinued without obtaining any records.

Two malaise traps (designed to primarily sample daytime flying insects) were obtained and, after some initial problems with cattle damage, were installed in small securely fenced enclosures within the Cherry and Far Orchards. These two orchards were given preference over the Old Orchard because they were larger, had a greater content of dead wood and appeared to present more varied invertebrate habitat. These malaise traps were run continuously throughout the recording season and emptied at approximately 7 day intervals. A total of 70 samples were collected in 70% alcohol, most containing a hundred or more specimens. The malaise trap samples were collected in fluid (70% isopropanol) and were identified wet in the collecting fluid or, in a few cases, dried out and pinned to facilitate further study.

Light traps (designed to sample night-flying insects, principally moths) were run for varying periods on a total of 10 nights during the season. On each occasion several traps including both mercury vapour and actinic lights were used.

2.3 Surveyors and survey dates

A total of 24 surveyors (see Appendix B1) visited the orchards on one or more occasions, the actual number of visits depending on the taxa studied, the tasks involved and the availability of the individual concerned. One particular individual (Mick Blythe), who was in charge of the malaise traps visited the site on no less than a total of 42 occasions, 35 of them to empty the malaise traps, twice to look for Diptera attracted to moth traps and 5 times to sample insects with conventional methods.

2.4 Identification and verification

As far as possible, identifications were made by WFSG members, either in the field or from collected samples. When considered necessary, specimens (particularly of invertebrates) were sent to national experts for confirmation of identification. Appendix B1 lists the contributors to the study, their area of expertise and type of their involvement in the work.

An exception to this procedure was the handling of some of the 70 malaise trap samples. Timely processing of the huge number of specimens (largely Diptera) involved imposed an impossible workload on the WFSG members who nevertheless succeeded in analysing 47 of the samples in-house. In order to expedite completion of the analysis, a consultant entomologist (Dr Peter Skidmore) was contracted by English Nature to sort and identify the remaining 23 samples.

2.5 Additional data incorporated

A survey of the lichens in the orchards had been carried out by Joy Ricketts in 2000 and she gave permission the results of that survey to be incorporated into the current study. Because there was not expected to have been any significant change since that survey, no further survey work was performed on this group.

2.6 Treatment of taxa

At the highest level, taxa were grouped for convenience according to the taxonomic units typically studied in the field by the WFSG members. These taxon groups were not necessarily of equal taxonomic status. Thus these groupings (referred to in this report as "High Taxa") might be by Phylum (eg Mollusca), Class (eg Mammalia, Arachnida) or Order (eg Diptera). For consistency all insect orders were treated as "High Taxa", even if represented by only a small number of species. Within each high taxon, records were assigned rigorously to family and to species (subgenera were ignored), but in a few cases subspecies were recognised. For convenience of computer processing and sorting, families and species within those families have been arranged in purely alphabetical order. No attempt has been made to arrange the species tables in preferred taxonomic order (as in formal checklists).

Where identification to a genus or species group was possible, but assignment to a particular species uncertain, the following abbreviations have been used for the specific part of the binomial name: "sp." for "species", "agg." for "aggregate" or "gp." for "group"; eg "*Rosa canina agg*.".

In a few cases, where species pairs cannot be separated (as is the case in females of some Diptera species) both specific names are given combined with a slash eg "*Cheilosia albitarsis/ranunculi*". In all these cases, a special indicator has been used to ensure that the species is only counted in the totals if it is definitely different from any other species listed (ie there are no other species listed in the same genus).

2.7 Data processing

A simple database was set up by one of the WFSG group members (Malcolm Smart) and used to collate the total of 6,353 records that were assembled for all taxa (other than the fruit trees which were surveyed and recorded separately). This enabled an identical record format to be used for all groups so that records for all taxa could be processed and tabulated in a uniform way. Mike Bloxham provided considerable assistance in validating the data set.

The species table in the database was constructed with indicator fields for saproxylic association, dung association, and bloodsucking habit (see section 2.8) in addition to conservation status and Biodiversity Action Plan (BAP) status to enable classification of the recorded species by assemblage and conservation status. Links to a number of external data sets enabled all but one of these indicators to be automatically updated.

2.8 Species assemblages and community associations

The grouping of species into species assemblages and the identification of links between species and habitat types provide a structure for assessing the biodiversity value of a habitat, for example in relation to priority BAP habitats. In addition, the search for pattern in the occurrence of species is critical to order to understand which important factors influence orchard species diversity and rarity. The species records for vascular plants, fungi and invertebrates were labelled as belonging to the following different assemblage types, where information allowed.

- Hedgerow species; those vascular plants recorded only from the hedgerows around the orchards
- Saproxylic invertebrates; invertebrates dependent on wood-decay habitats, derived from Alexander (2002). The list includes some species associated with undecayed timber and bark
- Saproxylic fungi and fungi growing on dung, based on the knowledge of members of the Study Group
- Insects associated with cow dung derived from Skidmore (1991)
- Bloodsucking insects based on the personal knowledge of Malcolm Smart and Mike Bloxham

2.9 The JNCC database of conservation status

A database of UK species conservation status designations has been published by the Joint Nature Conservation Committee (JNCC 2005) on their web site. The database contains a list of all species which has been assigned formal conservation status in British Red Data Books and subsequent Reviews (it also contains information on the legal protection status of each species). The JNCC database was linked to the species table in Bowcastle Farm orchards database, enabling the latest status data to be used.

Because of a historical change in the definitions of the formal conservation categories some explanation of these is necessary. The concept of assigning conservation status indicators for wildlife was first formalised by the International Union for the Conservation of Nature and Natural Resources (IUCN, now known as the "World Conservation Union") in the 1980s. The categories defined by the IUCN at that time were adopted for the British Red Data Books and subsequent species status reviews. While the IUCN criteria for the high risk categories ("Endangered" and "Vulnerable") were strictly defined, the criteria for inclusion in the "Rare" category was left to national conservation authorities. All British Red Data Books and species status reviews published up to 1994 assigned statuses based on these categories with the addition of an extra lower risk nationally defined category called "Notable". These categories came to be known in the UK as RBD1, RDB2, RDB3 and Notable respectively. Species insufficiently known to assign to a particular category became known as RDBK.

In 1994, the IUCN approved a new and more rigorous set of criteria, defining a new set of species status categories which are not identical to the to the previously used categories. These are entitled "Critically Endangered", "Endangered", "Vulnerable" and "Lower Risk (near threatened)", "Lower Risk (nationally scarce)" and "Lower Risk (least concern)". All Red Data Books and species reviews published since 1994 have assigned species statuses based on the new criteria. The last category, "Lower Risk (least concern)" is not used in practice. "Lower Risk (nationally scarce)" category has been defined to make it identical to the previous "Notable" category.

Since most taxonomic groups have only been assessed for conservation status once, there are two different sets of status categories in use which are not strictly equivalent. Some taxonomic groups have not yet been formally reviewed at all (eg Fungi) and so their species have not been assigned formal statuses while other groups (eg Diptera) have some families assessed under one set of criteria, some with the other and some families not assessed at all.

Table 1 below compares the two systems. It should be noted that a species assessed in a review before 1994 as RDB1 (Endangered) and not reassessed since will now be classified as EN (Endangered) even though the definition of the category has changed. A species classified as Notable (N) at the same time will now be considered Nationally Notable (NN), even though a new identically defined category Nationally Scarce (NS) has since been defined. In Appendix C, species having the IUCN category status are shown with an asterisk before the letter denoting status, eg *N, whereas the national, non-IUCN, category species do not have this asterisk.

Table 1 Conservation status categories and abbreviations used in the JNCC database

Pre 1994 Category assignments				Assignments 1994 onward			Note
Definition Authority	Category Name	Category Abbreviation	JNCC database	Definition Authority	Category Name	JNCC database	
IUCN	Extinct	RDBX	EX	IUCN	Extinct	EX	Identical
				IUCN	Extinct in the wild	EW	
				IUCN	Critically Endangered	CR	New category
IUCN	Endangered	RDB1	EN	IUCN	Endangered	EN	Differently defined but assumed identical in JNCC spreadsheet
IUCN	Vulnerable	RDB2	VU	IUCN	Vulnerable	VU	Differently defined but assumed identical in JNCC spreadsheet
				IUCN	Lower Risk (conservation dependent)	LR (cd)	New category
				IUCN	Lower Risk (near threatened)	LR (nt)	New category
IUCN	Rare	RDB3	NR	National	Nationally Rare	NR	Identical
National	Notable	N	Nationally Notable	National	Nationally Scarce	NS	Identical but different names used in JNCC spreadsheet
National	Notable A	Na	Nationally Notable A	National	Nationally Scarce	NS	Distinction Now abandoned
National	Notable B	Nb	Nationally Notable B	National	Nationally Scarce	NS	Distinction Now abandoned
				IUCN	Lower Risk (least concern)	LR (lc)	Catch-all for everything else, of no interest, in spreadsheet used only for plants
IUCN	Insufficiently Known	RDBK		IUCN	Data Deficient	DD	Effectively identical definitions but now applied more rigorously
				IUCN	Not Evaluated	NE	Not applied in JNCC spreadsheet
				National	Red	Red	Special Bird Category
				National	Amber	Amber	Special Bird Category

2.10 Status of birds (Aves)

Bird conservation statuses are assessed by UK conservation organisations in a different way to the above scheme (Anon. 2002). The current list contains 40 UK species of high conservation concern (Red-listed) and 121 are listed as having medium conservation concern

(Amber-listed). For bird species the "Red" and "Amber" indicators are carried in the JNCC database in place of the standard IUCN-style categories. Red list species are those that are Globally Threatened according to IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery. Amber list species are those with an unfavourable conservation status in Europe, those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.

2.11 Status of Fungi

Fungi have been provisionally assessed using the IUCN criteria via the Provisional Red Data List (Ing 1992). The new checklist (Legon & Henrici 2005) provides some information on the status of species but it is noted that the new Red Data list is still in preparation. This data is not included in the JNCC database. In its absence the conservation value of the species recorded at Bowcastle Farm has been based on the number of occurrences of the species recorded in the British Mycological Society's Fungal Records Database (BMSFRD). For further discussion of this database see section 9.4.

3 The area of study

3.1 Bowcastle Farm landscape setting

The Bowcastle Farm orchards comprise three small orchards that lie to the south-west of Bewdley (Grid Reference SO 768751). The site consists of one large cherry orchard (Cherry Orchard) with many fine mature trees, a smaller adjacent orchard containing old pear trees and some apple and cherry trees (Old Orchard) and a third orchard, adjacent to the edge of Wyre Forest, consisting of mature apple trees and some cherry and damson trees (Far Orchard). The three orchards together cover an area of 5.39 hectares. All three orchards are within the Wyre Forest Site of Special Scientific Interest and have been entered by the owner into the Countryside Stewardship Scheme.

Bowcastle Farm lies on the eastern fringe of the Wyre Forest woodland complex near the top of a long gentle slope that forms part of the Severn Valley (see Appendix F Map F1). To the south is a small valley with a stream that flows north-east towards Bewdley. This area was once covered by numerous orchards, many of which are now lost to the urban expansion of Bewdley. Local place names such as Blossom Hill and Cherry Orchard still persist. An estimated orchard loss of between 60-70% has occurred in this area since the 1960's (English Nature unpublished data). The Bowcastle Farm orchards are set in a pastoral landscape dominated by woodland and semi-improved grassland, divided into smallholding units with hedged fields. The immediate surroundings of the orchards include grassland and ancient woodland. Other orchards still persist in the immediate area, within 0.5 km of the Bowcastle Farm orchards, but they are either neglected, partly destroyed or more intensively managed.

The Wyre Forest adjoins Far Orchard, and the orchard farthest from the Forest, Cherry Orchard, is less than 300 metres (m) from the Forest edge (Appendix F Map F1). Historically the woodland had been traditionally coppiced for charcoal and oak bark. This management ceased about the time of the Second World War, the oak was singled and allowed to grow on giving rise to the homogenous stands of high forest oak of about 70 years old. The woodland is predominantly vegetation classification types W10 *Quercus-Pteridium aquilinum-Rubus*

fruticosus agg. and W16 *Quercus-Betula-Deschampsia flexuosa* communities (Rodwell 1991). Within the last 10 years, English Nature has revived the coppice-with-standards management in parts of the woodland. Close to Far Orchard there is now a series of contiguous coppice plots of about a third of an acre. These have been cut at the rate of one a year since 2003.

Bowcastle Farm lies in the south-western part of the Mid-Severn Sandstone Plateau Character Area. This area is dominated by the valley of the River Severn that flows in a north-south direction some 2 km to the east of Bowcastle Farm. The geology of the Character Area is largely Triassic Sandstone but changes to Carboniferous Coal Measures in this south-west corner. The orchards overlie Coal Measures which gives rise to acidic to neutral soils. Soils are heavy with sand, silt and clay, and hard, sandy, shale underlies a thin soil profile.

The local climate is harsh when compared to that of the rest of Worcestershire despite the proximity of the river valley. Late frosts are common and the season is often two weeks behind that of central Worcestershire. Rainfall averages 65 cm over the year. Rainfall amounts can vary at a local scale, but on a national scale the site is in a zone of relatively low rainfall (641-740mm/year, compared to the national range of 466-4577mm). National rainfall data is interpreted from Meteorological Office data for 1971-2000, (www.metoffice.com/climate/uk).

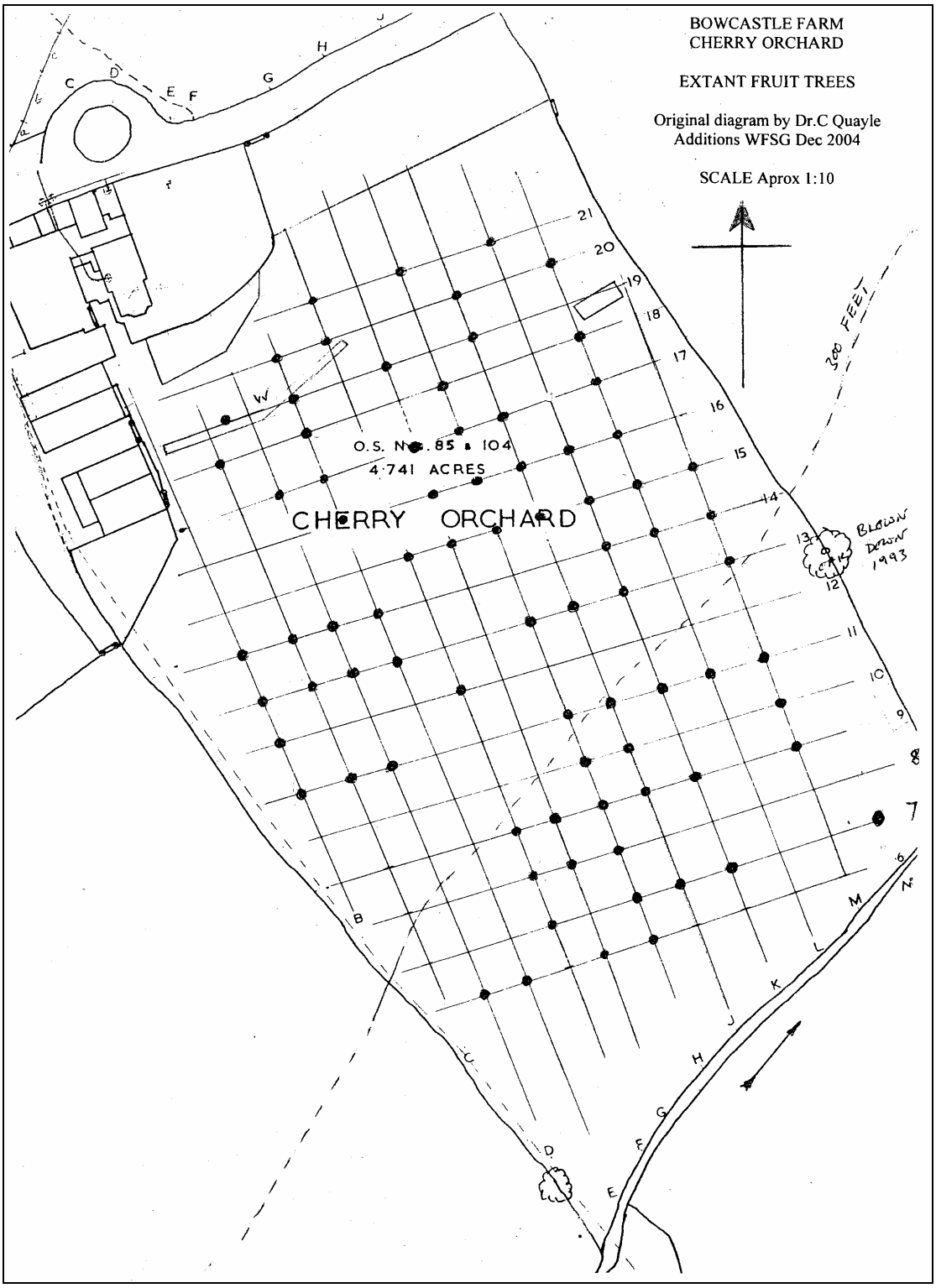
Deposition of pollutants can also vary at a local scale. However, at a national scale, Bowcastle Farm is in an area where deposition zones for sulphur and nitrogen change rapidly over a short distance due to the influence of the Birmingham conurbation, which is less than 20 km east of the orchards. Dry deposition of sulphur rises from 5-8 kg/S/ha/year to above14 kg/S/ha/yr west to east across the region; dry deposition of nitrogen rises from 2.1-4.2 kg/N/ha/yr to above 6.7 kg/N/ha/yr. Wet deposition of sulphur rises from below 3.7 kg/S/ha/year to 6.7 kg/S/ha/yr; wet deposition of non-ammonia nitrogen from below 2.7 kg/N/ha/yr to 4.6 kg/N/ha/yr (NEGTAP 2001). The historical pattern appears similar according to Hawksworth and Rose (1970). Birmingham was then in a zone with the greatest levels of sulphur dioxide pollution in England and Wales, and contained the fewest number of epiphytic lichen species.

3.2 Environmental features of the Bowcastle Farm orchards

3.2.1 Cherry Orchard

The orchard is a rectangular 1.92 ha plot, located south-east of the farm buildings, with mature thorn hedges forming the long boundaries running north-west / south-east (150º-330º). It is bounded to the south by a small stream, which flows north-east, with alders (*Alnus glutinosa*) alongside, and to the north by a post-and-rail garden fence. From the farm buildings at 105 metres (m) altitude, the orchard slopes gently down to the 100m contour. The whole area slopes evenly, but fairly steeply from the 100m level to the stream at 80m, a fall of 20m in 150m. (slope gradient of 17%). The aspect of the orchard is south-east facing and the orchard planting is somewhat skewed about 20º off a north-south bearing (see Map 1 below).

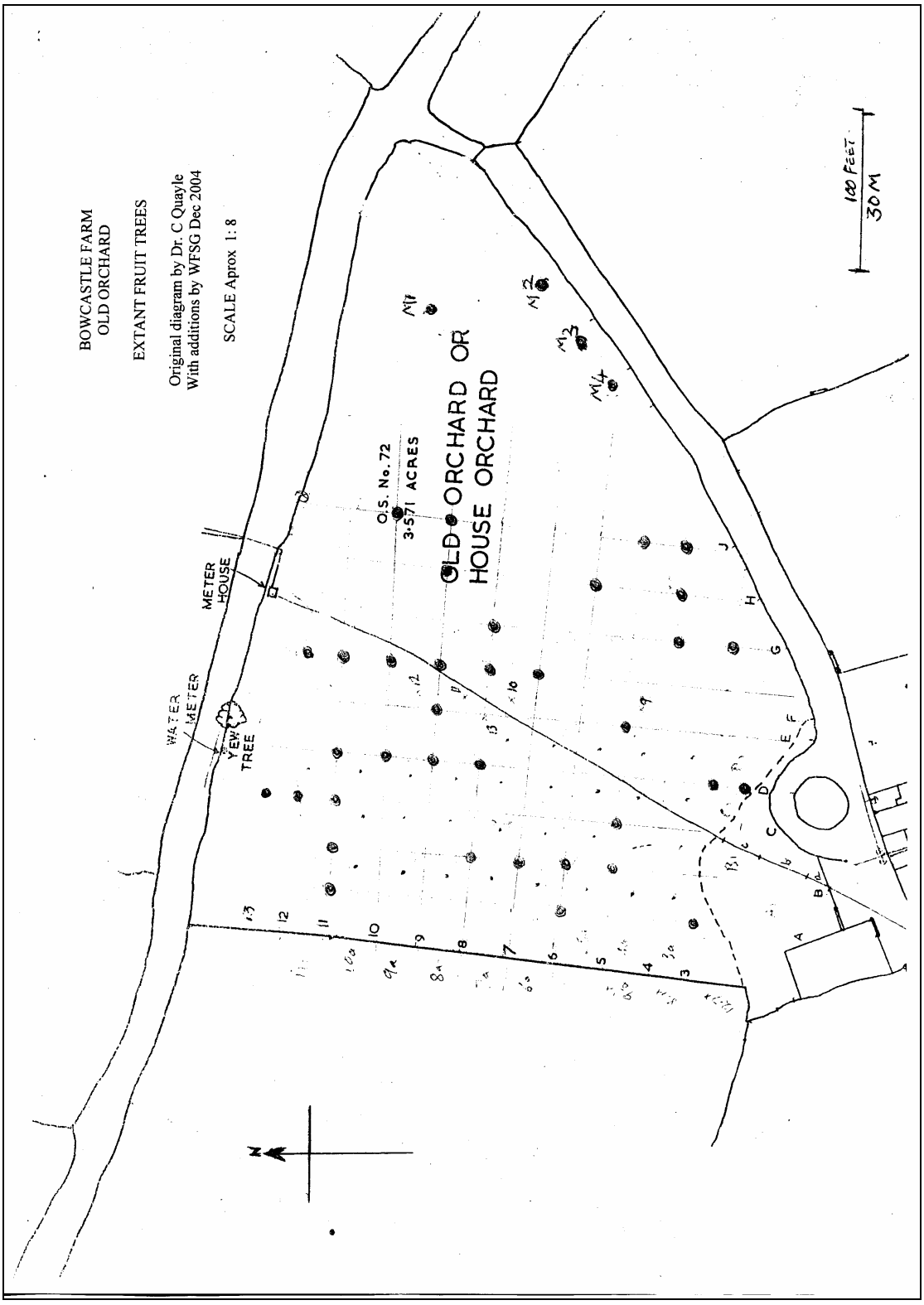
Map 1 Layout of Cherry Orchard showing tree row positions



3.2.2 Old Orchard

Old Orchard is a triangular 1.45 ha field lying north-east of the Bowcastle farm buildings. To the north a boundary hedge follows a lane to Ruskin Land, another small-holding, in Wyre Forest, and to the south-east a post-and-rail fence lines the farm access. The third boundary, a large mature hedge, runs nearly north-south on the western side of the orchard. The orchard rows run parallel to this line (see Map 2 below). The south-west corner of the orchard is the highest area at about 105m and the aspect of the orchard is north-east facing. The land undulates and falls gently to the north-east, to about 90m altitude at the north-east corner, a greater fall than a visual impression suggests. The slope gradient from 90-105m is 8%. Water drains northward through a slight depression along the western side of the orchard, making some soft ground around tree row B, with even a few plants of (*Juncus sp.)* occurring there.

Map 2 Layout of Old Orchard showing tree row positions

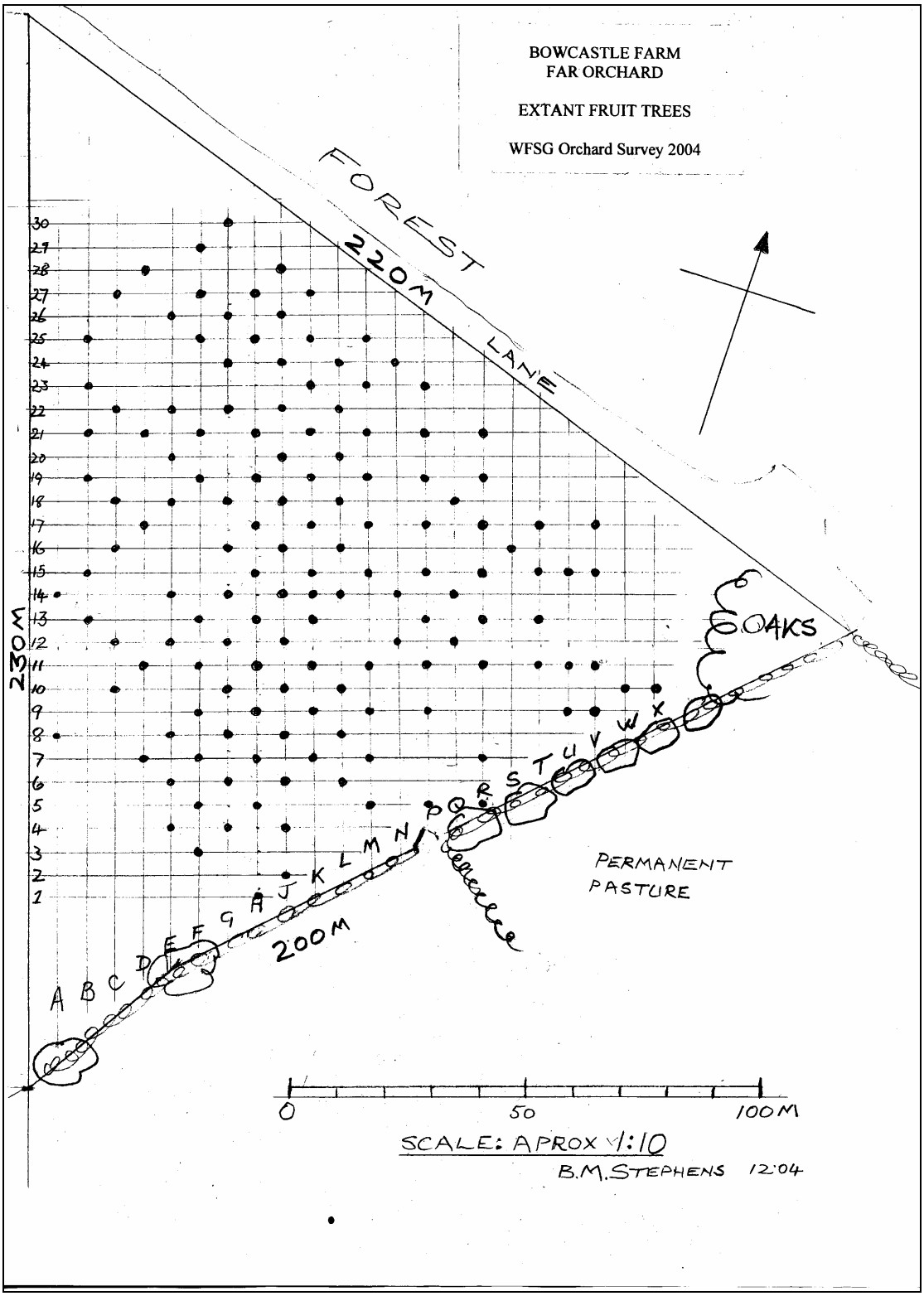


3.2.3 Far Orchard

Far Orchard is a triangular 2.02 ha field with woodland on two sides and grassland along the third, southern, side. To the north a wire fence separates the orchard from the lane to Ruskin Land and from mature oak woodland. To the west a post-and-rail fence runs north-south,

separating the orchard from high forest of standard oak, (*Quercus petraea)*. The southern boundary is an established thorn hedge with standard oak and ash (*Fraxinus excelsior),* which separates the orchard from grassland. The aspect of the orchard is north-facing in general though most of the area is plateau with slight undulations. The ground slopes gently from 110m at the south corner to about 95m at the northern corner. The orchard rows run parallel to the western boundary (approximately 200m long) with rows decreasing in length as they progress eastwards across the field (see Map 3 below).

Map 3 Layout of Far Orchard showing tree row positions



3.3 Factors and activities potentially influencing orchard biodiversity

During 2004 all the orchards were cattle grazed on rotation. In line with Countryside Stewardship guidelines, there is no grazing in Old and Far Orchards during January, February and March. This does not apply to Cherry Orchard as access to the barn is required from the

fields beyond. No fertilisers or pesticides are applied to the orchard grasslands or the trees. Cherry Orchard has been the site for bee hives since the early 1970 and these provide a breeding location for a range of insects.

Cattle dung is potential breeding ground for some flies of (eg families Sepsidae, Sphaeropheridae and Scathophidae) and many beetles and other invertebrates. The cattle are treated with a proprietary worming liquid twice a year, and this may influence the numbers and species of dung-breeding invertebrates.

The presence of a mature farm garden adjoining both Cherry and Old Orchards has a bearing on the fauna. This garden was created in the 1930s and extended in 1999 to contain a wide range of plants and shrubs and a small pond, providing breeding and feeding opportunities for a range of insects and other invertebrates. Grass cuttings are deposited at the top of Cherry Orchard.

The close proximity of Far Orchard to the Wyre Forest is likely to have some influence on the animals recorded there and many of the animals which breed in the woodland might have been moving through the orchard or coming in to feed. The light traps used in Far Orchard and Cherry Orchard may have attracted insects in from the Forest.

There is no standing or running water within the orchards but there is a small stream running along the southern edge of the Cherry Orchard, just outside and parallel to the boundary fence and an adjacent small lake, both of which may provide habitat for fresh water invertebrate species that might easily find their way into that orchard.

3.4 A brief history of Bowcastle Farm

3.4.1 Management history

There are no records to hand revealing how Bowcastle Farm was managed during the 19th century and early 20th century. Cherry Orchard was re-planted in the early 1930's except for a few survivors at the top of the field which remained from an earlier planting but these latter trees are not easy to distinguish. Some removal of dead trees from Cherry Orchard took place in 1979. The pear trees in Old Orchard were already established when the Quayle family took over the farm in 1929. In view of a strong Non-Comformist tradition in the family there would not have been any cider or perry varieties planted after 1929. It is believed that the cherry trees in Far Orchard were planted in the mid-1930's and it is reasonable to suppose that the apples were planted at about the same time. The main varieties of apple are Annie Elizabeth and Bramley, which were widely grown for market in the Midlands during the 1930's and remain popular. New planting has been carried out in each orchard during 1999, 2002 and 2003, following the existing layout of the trees.

There has been a long history of cattle grazing since the 1930s and the present grazier has had heifers and bullocks on the farm since 1972. From 1972, until about 10 years ago, inorganic nitrogen fertiliser was applied to all the orchards but not uniformly to the entire orchard floor. No sprays have been used in the orchards in the past as far as is known.

3.4.2 Evidence of land use on the 1845 tithe map

The 1845 Tithe Map (Appendix F, Map F2) does not show the buildings or name Bowcastle Farm as such, although the fields can be identified. What is now called Cherry Orchard was then called Barn Piece. What is now called Old Orchard formed part of Haddocks Burgage and the south corner of the site of Old Orchard shows a small enclosure. Alongside the lane into the forest, there are three long, narrow, un-named plots. Separating Haddocks Burgage from the un-cleared forest of Symonds Stool Coppice is a burgage-like plot described as "house and orchard" past which the lane continues into the forest and the small holding known as Uncles.

3.4.3 Evidence of land use on the 1870 crown sale map

In 1870 the Crown disposed of 100 Lots over a 2-day sale on 30 June and 1 July covering many properties in and around Bewdley and large areas of Wyre Forest. Lot 71 covered Bowcastle Farm. For convenience of identity in the Government sale particulars, each enclosed area was numbered (see Appendix F Map F3). Information about the management of the land at that time can be deduced from the details attached to these numbers in the sale particulars.

Area Number 202 describes Bowcastle farm-house, buildings and orchard, (now called Cherry Orchard). The orchard is described as under grass. There are no other details, but the descriptions do establish that at least some of the present orchard area has been orchard for at least 134 years, since 1870. Area Number 205, near the farmstead, is also described as orchard and grass and forms part of the present Old Orchard. It is twenty eight perches in area, about 29 yards square (1 rod, pole or perch = 5.5 yards.). Of the three strips along the lane side, 208 is "Garden and Orchard" (39 perches, nearly quarter acre), Number 209, orchard with grass, is nearly half an acre, (1 rood 36 perches); the third, part of 212, although included as "enclosure from forest" with no mention of house or orchard, would seem from the boundary to have had different treatment from the main area of that number. Area Numbers 210 and 211, where the bulk of the current site of Old Orchard is located, were arable land. Adjacent fields (Numbers 212, 213, 214, 215), arable or grass in 1870, are described as "enclosure from forest" or "enclosure from coppice". These phrases, used deliberately, suggest the clearance was recent enough to be meaningful to intending purchasers. These same areas were shown on the 1845 map (25 years earlier), but this gives no clue as to when they were cleared. The site of Far Orchard was within Symond's Stool Coppice, so was woodland at that time.

3.4.4 Evidence of land use on the 1882-83 Ordnance Survey map

The Ordnance Survey mapping of the area took place in 1882 and 1883 and the first published edition of 1891 shows some changes at Bowcastle Farm (Appendix F, Map F4). It is not known whether John and Harriet Powell, the tenants at the time of the Crown sale, continued as tenants after the sale, but at that time their holding amounted to about 50 acres. No doubt the other small tenancies were surrendered, as minor adjustments to field boundaries are shown. Most significantly, the map shows that an area of forest has been cleared to create what is now known as Far Orchard, with the same boundary as the present plantation. This can be dated therefore to within the 13 years between 1870 and 1883. The location of Cherry Orchard shows fruit trees planted on the higher one-third, on what is now garden, and extending down the slope. Old Orchard has been established by dividing the

former Haddocks Burgage (Areas 210 and 211, arable in 1870) with the present hedge line and including the former orchard (Area 105) and the small plots (Area 208 and half of 209). Thus we can date the hedge and most of the Old Orchard to within 13 years, between 1870 and 1883. Any surviving pear trees could not pre-date 1870 because there are now no trees remaining in the areas that were orchard in 1870. Those pear trees extant in 1929 could have been an original planting, and would have been at the most 59 years old, which makes them now 134 years old at the most.

3.4.5 Evidence of land use on the Ordnance Survey 1901 map

The Ordnance Survey revision of 1901 was published as a second edition in 1903 (see Appendix F, Map F5). Again fields have been re-shaped and show their present layout. The planting in Cherry Orchard had been extended by three rows further down the slope to the line of a footpath between Bowcastle Farm and Tanners Lane.

3.4.6 Evidence of land use on the Ordnance Survey 1925 map

The 1925 Ordnance Survey revision shows boundaries the same, the Cherry Orchard area has been slightly reduced, as if most of the 1901 planting had been removed (Appendix F, Map F6). Thus all but the one or two trees furthest down the slope below the line of the buildings may be from earlier stock, although there is no information to give any precise age of these trees.

3.4.7 Evidence of land use on a 1970 aerial photograph

An aerial photograph, held by the Worcestershire Historic Environment and Archaeology Service, can be reliably dated to apple blossom time in spring 1970. It shows all three orchards, with few signs of degenerating tree canopies. There are differences in size and some gaps in the pattern but no dead skeletal branches and fallen trunks, which would surely show in the sunshine of early afternoon, and which are so conspicuous now. Using data from the inventory one can compare the canopy of individual trees with the aerial photograph of 1970. From the documentary evidence described above, it seems that the southern corner of Far Orchard and the lowest part of Cherry Orchard have never been planted. If Far Orchard and Cherry Orchard were planted in the early 1930's, then by 1970 they would be 30 to 35 years old and still productive, but reaching maturity. It would appear that steady decline set in after this time. A number of trees were rooted out of the Cherry Orchard in 1979. The period, from the time when trees were mature and more or less healthy (Vitality Score 10) to the final stages of decay (Vitality Score 1) seems to have taken about 30 or 40 years (see section 5.1.4 for a description of the tree vitality scale).

4 Habitat survey of the orchard floor and boundaries

4.1 Habitat survey methods

4.1.1 Orchard floor habitat survey

The orchard floor vegetation was surveyed by walking over each individual site and recording plant species composition and sward structure. During spring and early summer a number of visits were made to record the flora using standard EN grassland survey recording

forms, and sketch maps were drawn showing the characteristic features, vegetation boundaries and field boundaries. These maps are shown below (Maps 4-6).

4.1.2 Vascular plant assemblages

Species assemblages for vascular plants were, where possible, related to the National Vegetation Classification, in particular to ascertain whether priority Biodiversity Action Plan habitats were present (UK Steering Group 1995). The NVC is the standard way of assessing vegetation types in the UK and the ecology of the assemblages is discussed in detail in Rodwell (1992). Abundances of plant species were recorded using the DAFOR scale (Dominant, Abundant, Frequent, Occasional, Rare). Nomenclature of vascular plants follows Stace (1997).

4.1.3 Orchard boundaries

The types of boundaries were recorded and, where hedgerows occurred, their composition was recorded and the number of native woody species noted. Ground flora at the base of the hedgerow was examined for woodland herbs, which add value to hedgerows. Criteria for defining the priority Biodiversity Action Plan (BAP) habitat 'Ancient and / or Species-rich hedgerows' include the presence of 5 or more native woody species in a 30 m length of hedgerow or a rich basal flora (UK Steering Group 1995). The condition of the hedgerow in terms of structure, hedgerow trees and recent management was noted.

4.2 Habitat survey results

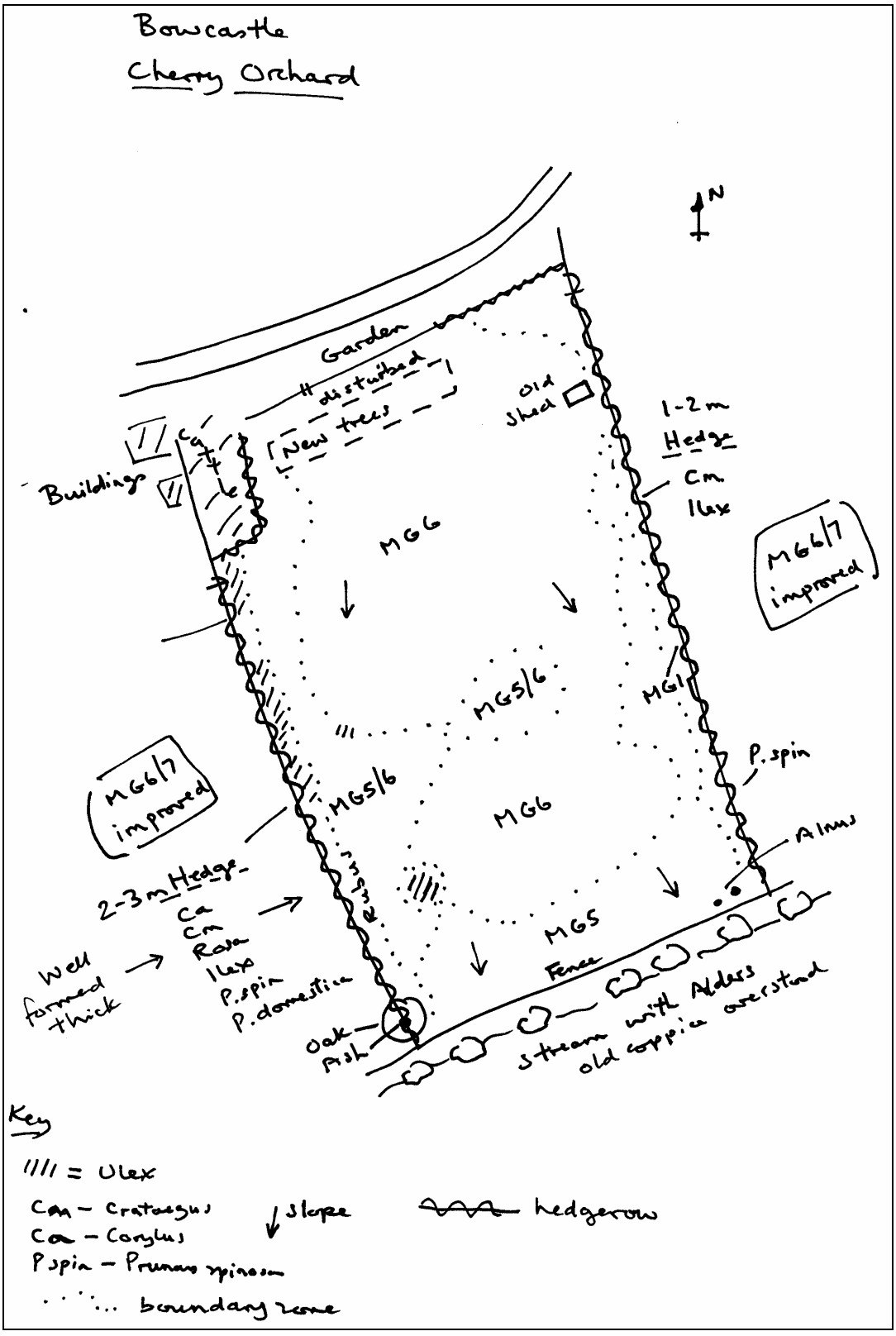
4.2.1 Orchard floor habitats in Cherry Orchard

Cherry Orchard contained the most diverse grassland sward with a mix of fine grasses, such as *Anthoxanthum odoratum* (sweet vernal-grass) and *Festuca rubra* (red fescue), although the grassland appears somewhat enriched by past fertiliser applications. The site contained a range of common herbs such as *Achillea millefolium* (yarrow), *Bellis perennis* (common daisy), *Plantago lanceolata* (ribwort plantain), *Leontodon hispidus* (hairy hawkbit), *Luzula campestris* (field woodrush), *Ranunculus bulbosus* (bulbous buttercup), *Hypochoeris radicata* (common catsear), *Trifolium repens* (white clover) and *Veronica chamaedrys* (germander speedwell) throughout the site. Of note was the high frequency of *Conopodium majus* (pignut) over the whole site. The vascular plant species list for the orchard is presented in Appendix D. The sward height of the grassland varied from 3 to 10cm with litter cover and bare ground both very sparse. The grassland was being lightly grazed with cattle during the summer. A small fenced strip of newly planted trees occurred to the northern end of the site.

Most of the areas in Cherry Orchard conformed to NVC type MG6 *Lolium perenne-Cynosurus* grassland (Rodwell 1992) but towards the edges and the southern boundary the sward became a mosaic of MG6 and MG5 *Cynosurus cristatus-Centaurea nigra* grassland, which is a type within the priority BAP habitat type 'Lowland Meadow' (see Map 4 below). The most diverse area occurred at the bottom (south) of the field with a small strip conforming to MG5. Many characteristic MG5 species occurred but at low frequency, suggesting some enrichment has occurred over time. The grassland nearer the hedgerows was ranker with an abundance of coarse grasses, such as *Dactylis glomerata* (cock's-foot) and *Arrhenatherum elatius* (false oat grass) as well as *Urtica dioica* (common nettle)

Hyacinthoides non-scripta (bluebell) and *Rubus fruticosus* agg. (bramble) in patches. The grassland here was closer in character to MG1 *Arrhenatherum elatius* grassland (Rodwell 1992).

Map 4 Orchard grassland habitats and boundaries in Cherry Orchard



4.2.2 Orchard boundary habitats in Cherry Orchard

The orchard was enclosed by tall hedgerows on the east and west boundaries. To the north was a fence line adjacent to the garden. The southern boundary bordered (but excluded) an stream lined by tall alder trees, which had been coppiced in the past. A few tall alder trees were present in the south-east corner of the orchard.

The hedgerows were tall and diverse, typically with 5 –7 species of shrub, and had associated ranker MG1 *Arrhenatherum elatius* grassland (Rodwell 1992) edges extending a metre out into the orchard grassland. All the hedges were regarded as species-rich under the priority Habitat Action Plan definitions with 5 or more native woody species per 30 m, thus qualifying under this criterion. The richness of the hedgerows seemed to reflect the past woodland history of the site. They were thick and some 2-3 metres tall, and trimmed, with few gaps. The western boundary hedge contained a mature *Quercus petraea* (sessile oak) and one *Fraxinus excelsior* (ash).

4.2.3 Orchard floor habitats in Old Orchard

Old Orchard had the most agriculturally-improved grassland among the three orchards, and was predominantly MG6 *Lolium perenne-Cynosurus* grassland (see Map 5 below), although the sward did contain 11 species of grass throughout, such as *Anthoxanthum odoratum* (sweet vernal-grass), *Agrostis capillaris* (common bent), *Cynosurus cristatus* (crested dog's-tail) and *Festuca rubra* (red fescue). It was not considered to be a recently re-seeded ley though had been under arable cultivation in the past (see section 3.4.3 above).

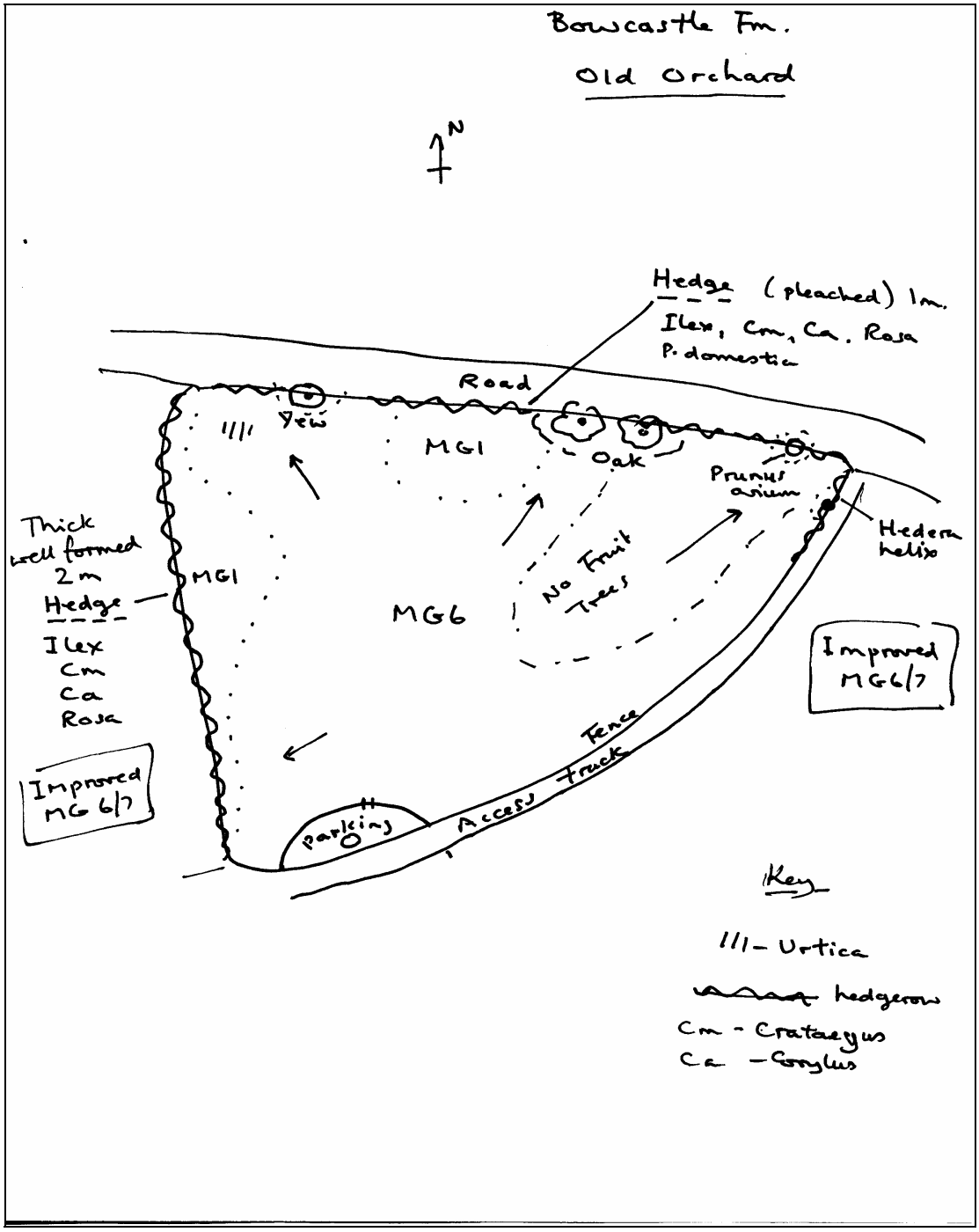
Herbs were scarce with only common species such as *Bellis perennis, Luzula campestris, Plantago lanceolata, Ranunculus bulbosus, Taraxicum spp.* (dandelion), *Trifolium pratense* (red clover) and *T. repens* at higher frequency. Towards the western boundary there was a more extensive area of MG1 *Arrhenatherum elatius* grassland (Rodwell 1992). The vascular plant species list for the orchard is presented in Appendix D.

The site was grazed by cattle from early summer onwards. The sward height was about 5cm in May 2004 and there was very little litter or bare ground.

4.2.4 Orchard boundary habitats in Old Orchard

The orchard had hedgerows with a mix of woody species along the northern and western boundaries and these were regarded as species-rich under the priority Habitat Action Plan definitions. A mature *Taxus baccata* (yew) and two mature oaks were features of the northern boundary. The more southerly boundary was a fence line adjacent to the entrance drive to the farm. The hedgerows were maintained by occasional trimming.

Map 5 Orchard grassland habitats and boundaries in Old Orchard



4.2.5 Orchard floor habitats in Far Orchard

Far Orchard had another relatively species-poor, grass-dominated, MG6 *Lolium perenne-Cynosurus* grassland apart from localised *Cardamine pratensis* (lady's smock). There was a small area to the north of grassland conforming to MG5c *Cynosurus cristatus-Centaurea nigra, Danthonia decumbens* (heath grass) sub-community grassland, with possibly some acid grassland, U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, but this only occurred in a very limited area. A diverse range of species occurred along this northern edge of the orchard with some scrubby areas *of Ulex gallii* (western gorse), *Crataegus monogyna,*

Salix aurita (eared willow) and *Rubus sp.* (see Map 6 below). This scrub, although limited in extent, was important for attracting many invertebrates to nectar. Herbs found here included *Potentilla erecta,* (tormentil), *Lotus corniculatus* (birdsfoot trefoil) and *Galium saxatile* (heath bedstraw). Unfortunately this sward represented only about 5% of the orchard area. A small area of 'wood pasture' oak trees occurred in the north-east corner. The vascular plant species list for the orchard is presented in Appendix D.

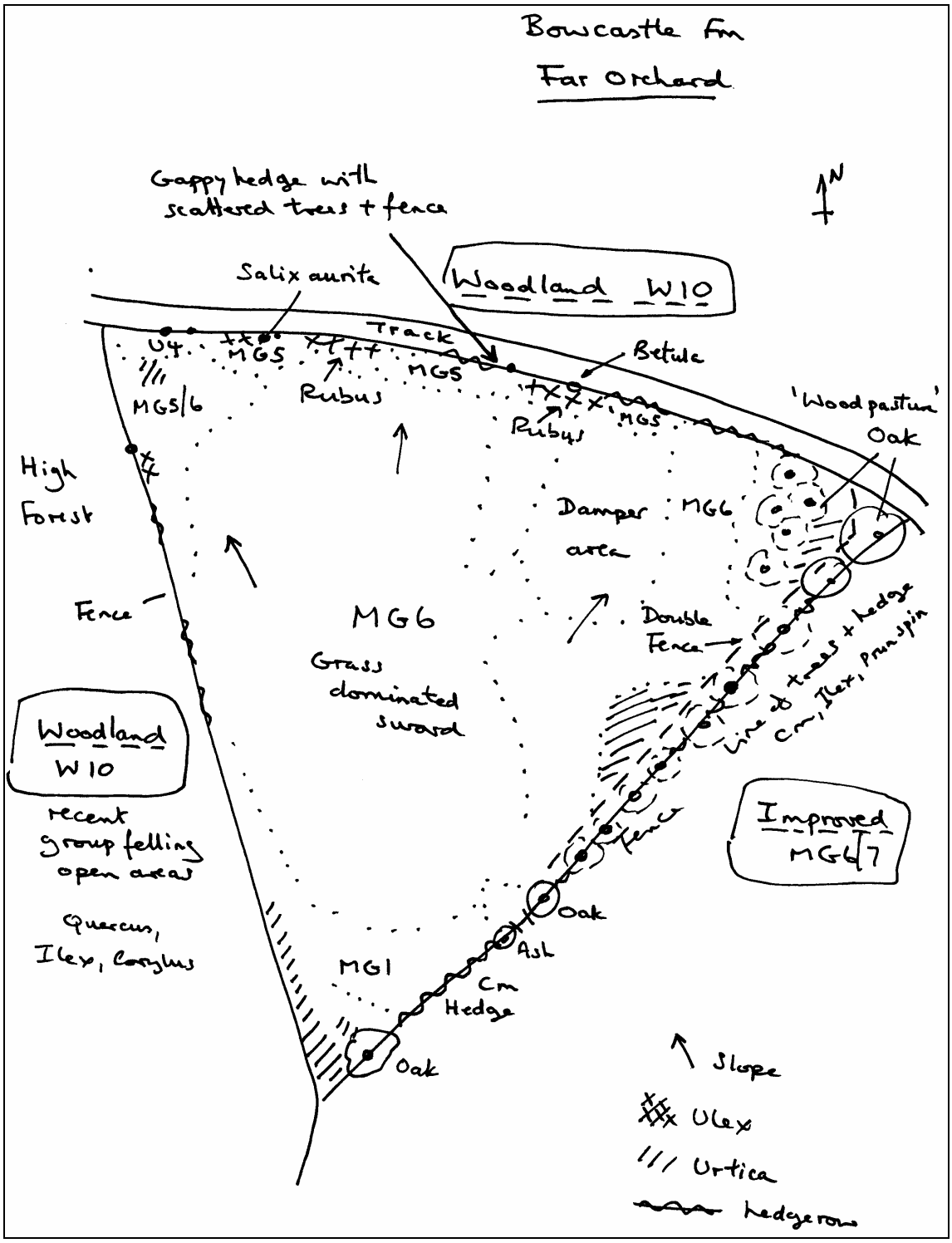
The grassland sward was 15cm in height in May 2004 and there was very little litter or bare ground. The site was cattle grazed from early summer onwards.

4.2.6 Orchard boundary habitats in Far Orchard

The northern boundary of Far Orchard was adjacent to a woodland trackway and consisted of an open hedgerow with large gaps and wire fence, close to patches of scrub in the orchard described above. The eastern boundary was a species-rich hedgerow, under the priority Habitat Action Plan definition, with *Corylus avellena* (hazel) and *Prunus spinos*a (blackthorn), and was somewhat shaded by a line of young oak trees, with more mature oak scattered throughout and with a mature ash towards the south. The hedgerows were maintained by occasional trimming.

The western boundary was fenced and adjacent to oak woodland (NVC type W10 *Quercus-Pteridium aquilinum-Rubus fruticosus* agg., Rodwell 1991). The woodland had some recent group felled areas forming more open scrubby glades.

Map 6 Orchard grassland habitats and boundaries in Far Orchard



5 Orchard fruit tree survey

5.1 Description of orchard trees

5.1.1 An alternative approach to the Veteran Tree Record

The scheme promoted by English Nature for describing ancient trees has been adopted by the Worcestershire Biological Records Centre as the Worcestershire Veteran Tree Record (VTR). Veteran tree features such as tree form, bark condition and trunk hollows are recorded for individual trees under this system. These features indicate the ecological value of each tree. However, for describing old orchard trees in this study, the scheme proved not to be easily workable. The VTR features do give, to some extent, a numerical notion of declining vigour of individual trees, with low numbers corresponding to greater health and higher numbers to more decay. The resulting set of numbers contains a description of a single specimen tree and gives data suitable for easy entry into, and storage in, a database. This data can of course be analysed and compared, but only when the data is de-coded can one form an impression of the tree. The three orchards at Bowcastle Farm had a large number of trees with veteran tree features so it was necessary to develop a simpler, quicker, way of recording these trees. This method is described in section 5.1.2 below.

The VTR is designed for the detailed description of single specimens, for purposes of record and long term monitoring of these individuals. In studying wildlife in orchards the objectives are often different, being related to the stand of fruit trees as a whole, as well as to the state of individual trees. Information at the level of the whole orchard is vital in the search for ecological relationships between habitat features and orchard biodiversity and in addition is of value to orchard managers.

5.1.2 A trial method for recording tree and orchard vitality

The large numbers of old trees in the Bowcastle Farm orchards meant that a simple, rapid system, workable in the field, was needed for describing the state of each tree. Brian Stephens developed a trial method for carrying out this recording and devised a scale of vitality to judge the condition of each tree. This scale can be used to make a rapid assessment of each tree, in a form that can be summarised across all the trees in the orchard.

The set of simple values, generated from estimates of 'Vitality' for a whole orchard, readily gives an overall impression of the general condition. However, the points on the scale are qualitative in origin and estimated subjectively. While simple averages or frequencies of Vitality scores for orchards may permit one orchard to be compared with another, statistical analysis needs to be applied with care.

The Scale of Vitality introduced in the current project is not yet fully developed nor tested on other orchards. The scale gives a single value which summarises the state of the whole tree. The scale does not indicate the possible causes of decline. Some extra detail may be required in some circumstance required to gain a fuller impression of a particular tree, especially features characteristic of the fruit species, and its process of decay.

5.1.3 The Scale of Vitality

A ten-point scale has been adopted for the Scale of Vitality. Logic would suggest 'ten' for the most healthy and 'one' for completely decayed trees. Thus an intact dead tree appears in mid-scale. The higher values refer to the state of health while some signs of life are still apparent. The lower scores, below 5, assess the extent of decay, towards the most thoroughly rotten. In this way the long and gradual, but continuous process from maturity to death and final decay is assessed on a single scale. Zero can be used to note gaps, where a tree may have been expected, but no signs remain. In many cases where the pattern suggests there was a tree, a slight depression can be found in the grass where a stump has been grubbed out, or the remains of the root, or merely the last vestige of a rotten branch nearby.

However, in the current survey, 'gaps in the line' have been not been recorded as part of the vitality recording, although they are a part of the total picture of gradual decay and some measure of the effects of time. The intermittent numbering along each row in the results (Appendix E) gives some idea where losses have occurred, for whatever reasons. The ends of rows are more problematic since, without planting plans, there is no certainty where a row ended. Zero values have not been included in any totals, averages or frequencies since large numbers of absent records do not contribute to a view of what is present and would tend to skew any mean values. A separate estimate was made of how many trees from the original planting in each orchard had gone completely (vitality scale value zero), as this could later be included in calculations if needed (see Table 3 for the results). Other surveys which adopt the scale of vitality will need to be clear on their treatment of zero scores.

5.1.4 Definition of the 10 points on the Scale of Vitality

10 **More or less healthy**, but tree mature and decline imminent. Even in spite of some storm damage only minimal signs of fungal or insect attack.

- Trunk (trk): sound, bark unbroken, sapwood intact.
- Branches (brs): minimum of die-back;
- Canopy: Complete, leaves (lvs) all over, current or recent new growth of leafy shoots, lvs. healthy and linger in autumn.

9 **Signs of decline:** Lack of vigour, signs of disease.

- Trunk: bark fissured or damaged, water entering from broken branches (usually above)
- Branches: twigs and small branches dead within the canopy, (depends on earlier pruning).
- Canopy: Sparse leaves on some branches, new leafy shoots sprouting from dying branches. Highest twigs and small branches protruding, without leaves.

8 **Definitely declining:** May be some new leafy shoots, but substantial branches dead.

- Trunk: Bark fissured, or peeling sapwood with insect infestation, patches of heart-wood exposed and insect-ridden.
- Branches: Medium sized branches dead (except perhaps for a few leafy twigs.).
- Canopy: Leaves abundant on some branches. Canopy misshapen or one-sided from a single branch surviving. Leaves falling earlier in autumn.

7 **Obviously dying:** Even if locally some young shoots show good growth, new branches <100mm diameter.

- Trunk: Rot encroaching from damaged upper or lower regions. Decay extensive through sapwood even if bark more or less intact. Bark detached from heart-wood.
- Branches: Larger branches dead (>100mm) especially extremities, some snapped off or torn out at the top of the trunk from wind or rot (ie graft position if top-worked.)
- Canopy: Up to half branches dead. Leaves sparse on most branches. Stag-headed. Leaves falling early in autumn.

6 **More than half dead:**

- Trunk: All or part hollow, bark fissured, detached in parts, areas of heartwood exposed and insect ridden, rot extensive.
- Branches: more than half the number dead, many broken, some life in parts, but no new growth except perhaps a few adventitious shoots. Bark peeling, parts rotten.
- Canopy: incomplete, few leafy twigs, sparse leaves.

5 **Dead:** No signs of life, tree may have fallen recently by breaking trunk or uprooting in wind. May appear as skeleton standing intact.

- Trunk: Sapwood little but frass, bark detached, heartwood exposed and insect and fungus infested.
- Branches: If standing tend to be drier, bark peels, sapwood infested. If on the ground then wetter and more fungus growth, heartwood under attack.
- Canopy: No leaves. May have many twigs and small branches still intact, especially if uprooted.

4 **Breakdown:** Twigs and smallest branches fallen.

- Trunk: Bark detached, heartwood structure losing identity.
- Branches: Large and medium branches remain, skeletal form.
- Canopy: Twigs and smaller branches missing, no form to a canopy.

3 **Skeleton:** Trunk and large branches only.

- Trunk: Most bark present even if detached, sufficient to recognise species, sapwood more or less frass, heartwood losing solid form, soft and friable.
- Branches: Break off easily, wood without structure.
- Canopy: Remains of largest branches.

2 **Rotten:** Trunk only standing in whole or in part, remains of branches on ground.

- Trunk: Sapwood and bark missing, heartwood remaining,
  if dry - then hard and more durable,
  if holding water (on the ground), then friable and without structure
- Branches: May be still attached to fallen trunk or lying separate, otherwise same state as trunk.
- Canopy: nil.

1 **Final remains**: Species barely recognisable, advanced decay.
- Trunk: May stand as a hollow shell or barkless stump, little sign of structure, fallen as a wet log on the ground, wood friable.
- Branches: fragments remain as wet logs on the ground, advanced decay.

0 **Evidence:** Signs that a tree was present.
- From the planting pattern within rows. (Planting at the ends of rows not certain without an original planting plan).
- Root stump at ground level.
- Depression in the ground at the expected location.
- Rotten logs scattered round a central area. (Rotting logs tend to get scattered by cattle).

5.2 Results of the fruit tree survey

5.2.1 Inventory of orchard trees

The survey was carried out between January and December 2004. The first task was to label all the mature trees to ensure individual identity, numbered within rows, giving reliable reference so that records would be consistent. Small white plastic labels were marked with black indelible felt pen, and secured with string which would not rot. On each tree the label was fixed high enough so that cattle could not reach and tied underneath a branch, on the north side, to give some protection from direct light and weather, and tight enough to prevent blowing about and being lost. This labelling, sometimes a problem, has proved quite durable and easy to read from several metres away. A number of new trees have been planted in each orchard between existing trees, following the same spacing, but these have not been included in the inventory. It should be remembered that this was a pilot study and methods evolved during the survey period, giving rise to some inconsistencies in the descriptions. No attempt was made to describe blossom or time of flowering. Work on this aspect and on the fruit varieties, needs to be continued.

All mature trees were described, together with measurements and notes adding further detail. The results of the recording of individual trees are presented in Appendix E. The extant position of the fruit trees and row identifications are shown on Maps 1-3. The explanation of the columns used in Appendix E is as follows:

Row: Row identification, see Maps 1-3 for position in each orchard.

Tree: Label number on each tree

Species: Fruit species. Apple, pear, cherry and damson can be distinguished by blossom, leaf and fruit, and in winter by tree form but most easily by the bark.

Vitality: Score on the Scale of Vitality (see section 5.1.4).

Tree measurements:

Height including dead branches, was estimated by proportion relative to a 2m stick placed upright against the trunk.

Girth to the nearest centimetre was measured with a tape at 1.3m from the ground. Occasionally a lack of bark made an estimate necessary or a measurement taken at ground level.
Spread including dead extremities, was paced out from E-W.

Note: all measurements are in metres.

Veteran tree features and management signs:

- **Trunk:** Four features have been used to describe the trunk; position, rot, fissures and tar.
  ***Position*:** fallen = **F**, (on the ground the trunk would be wet, but propped on branches, dry, thus affecting the decay process.); leaning = **L**, (usually downwind); broken or uprooted = **U** (may be detached or retaining some functioning contact). The trunk should be assumed to be standing and straight if no letter is present.

  ***Rot*:** sound = **S**; rotten = **R** or hollow = **H** at top middle or base; standing dead skeleton = **Dsk**.

  Fissures: these take various forms and details of size, shape and position have been recorded, but not included in the summary. Many of the large apple trees lean and it would seem that this affects water run-off. There is often a fissure on the upper surface, starting possibly from a slight damage, and water penetration, causing local rotting to sapwood and heartwood.

  Tar bands: these are bands which had been put on the trees as a pest control measure. They were positioned around the trunk at eye level between 1.6 m and 1.9 m. Often, only traces of old bands were visible.

- **Branches:** broken branch = **B**; sawn off = **C**; dead = **D**; live = **L**. Damson and apple can have die-back in the canopy, forming a mass of small dead branches, and twigs with leaves forming an outer covering. With pears and cherries die-back starts from the extremities and there is often a mass of new young shoots at the top of the trunk and skeletal dead branches remaining. The **number of branches** and the **diameter** of main branches were recorded in most cases, but only numbers of broken, cut or dead branches are included in Appendix E.

- **Bark:** In many cases, particularly on cherry trees, the bark is detached (**=D**) because the sap-wood has been infested and eaten away, leaving only a mass of frass and the bark more or less intact round the still solid heart-wood. In other cases bark is split length-wise and in one or two cherries, horizontally at graft level (**=S**). At a later stage, bark falls off (**=G**), but not necessarily from the whole trunk or branch completely.

Fruit variety: Varieties have been identified as far as possible, but most identifications are tentative. Names given to cherries are those asserted by Mr. Clifford Evans of Bark Hill in 1979, for the Cherry Orchard. Elton, Napoleon, Black Eagle and Early Rivers could be confirmed with some confidence, but mature ripe fruit was lacking for firm identification. In future, to be certain of obtaining fruit, this would need to be protected from birds. Pear varieties were identified in 2005. The apples have received attention from experienced members of the Marcher Apple Network and their naming should be accepted

Crops: Comments on the quantity of fruit crop, numbers quoted refer to the actual numbers of fruits.

Photographs: Systematic photographs have not been taken, but some are available which represent most aspects of the situation. It is suggested that with digital cameras it would be feasible to record each tree and reduce laborious collection and recording of tree descriptions and could be more meaningful. Various members of the Study Group have taken photographs and an index would be useful.

Woodpecker holes: Woodpeckers were breeding in the trees and numerous holes were a conspicuous feature of the orchards, particularly in Far Orchard. Other bird species, such as great tit and redstart, also used holes in trees as discussed in the bird survey results below (see section 12.3). Holes were recorded with height above ground (metres), diameter in mm, and aspect (N, NE etc).

Fungi: Only some obvious fungus fruiting bodies on the trees have been noted.

Epiphytes (vascular plants): Seedlings of epiphytes can germinate in the humus which accumulates in the fork of a tree. Such growth occurs mostly with crown-worked cherries. Epiphytes were most frequent in Cherry Orchard. No mistletoe was recorded in the orchards.

1979 survey (Cherry Orchard only): Cross-reference to a tree survey in 1979.

Notes: These include details of interest not otherwise covered.

5.2.2 Numbers and species of fruit trees present and numbers of missing trees

The overall numbers and fruit tree species were summed for each orchard and for all three orchards (Table 2) and the numbers of trees that had been lost were estimated (Table 3). The estimates of numbers of trees missing did not include the end positions.

Table 2 Numbers and species of fruit trees

Fruit species	Cherry Orchard	Old Orchard	Far Orchard	Total
Apple	2	9	44	55
Cherry	77	0	82	159
Damson	0	0	18	18
Pear	0	28	0	28
Total	79	37	144	260

Table 3 Estimates of numbers of missing trees

Row	Cherry Orchard		Old orchard		Far Orchard	
	No. of sites per row	No. missing	No. of sites per row	No. missing	No. of sites per row	No. missing
A			9	6	4	2
B	4	0	8	3	7	1
C	8	4	9	5	10	4
D	12	7	10	4	12	7
E	15	7	5	3	12	3
F	15	7	6	2	14	3
G	14	7	6	3	14	2
H	15	3	6	3	14	2
J	14	4	7	3	14	0
K	15	7			12	0
L	10	3			10	1
M	7	1	4	0	11	1
N					7	4
P					10	1
Q					3	0
R					9	1
S					1	0
T					4	0
U					4	1
V					5	1
W					1	0
X					1	0
Totals	129	5	70	32	179	34
%		39		46		19

5.2.3 Planting distances

Distances between trees, both within rows and between rows (centre to centre), were measured to indicate planting distances. (Note: Metres multiplied by 3.25 equals feet.)

Table 4 Planting distances of trees in each orchard

Cherry Orchard			**Far Orchard**		
Between rows	**Metres**	**Feet**	***Damsons***	**Metres**	**Feet**
H16- J16	8.7	28.5	**Between Rows**	5	16.5
F15- G15	8.84	29	**Within Rows**	5.25	17
G15-H15	8.84	29	***Cherries***		
H15- J15	8.84	29	**Between Rows**		
J15- K15	9.6	31.5	E-F	5.2	17
K15-L15	8.84	29	F-G	5.2	17
L15- M15	9.15	30	H-J	5.2	17
Within rows			**Within Rows**		
G16- G17	7.9	26	E4-E6	10.5	34.5
H15-H16	9.3	30.5	E6-E8	10.5	34.5
H16-H17	8	26.25	Row G	10.2	33.5
H17-H18	7.7	25.25	***Apples***		
Old Orchard			**Between Rows**	5.2	17
Between Rows	**Metres**	**Feet**	**Within Rows**		
A-B	8.8	29	D7-D9	10.25	33
E-F	4.6	15	D9-D11	10.25	33
Within Rows			M6-M7	10.5	34.5
B5-B6	9.45	31			
B6-B7	8.7	28.5			
B7-B8	9.6	30.5			
D8-D9	9.45	31			
E8-E9	9.7	31.75			
F10-F11	9.45	31			

The averages recorded were standard distances for planting of orchard trees in the early twentieth century. Note that in Far Orchard the trees in adjacent rows were alternate in position, allowing more rows and permitting more spread of canopies (see Map 3).

5.2.4 Fruit varieties in the orchards

A survey of orchards would be incomplete without mention of the fruit. However, identification is not easy in many cases, especially with regard to cherries where differences between varieties are slight and subtle and the literature less extensive than that for apples. Although many trees throughout the three orchards had some fruit (often only a single fruit), good and typical samples were difficult to obtain. Careful observation over several seasons of many details, from tree habit, (impossible in many cases and anyway affected by root stock, grafting and pruning), blossom, fruits and leaves, are usually needed to confirm fruit varieties with any sort of confidence.

Damsons usually present no problem with identification as there are few varieties to choose from in making an identification. However, once names are lost from other top fruits, naming is difficult. It is recommended that a standard recording format is developed so that less experienced observers can complete consistent, reliable and thorough descriptions of apple, pear, cherry, and plum. There is also a need to develop satisfactory dichotomous keys for identification. Apples are better served than cherries, but such keys as are available use subjective characters like time of ripening, or colour. Indeed Grubb (1949) states “whether it

will ever be possible to form a satisfactory key for individual varieties (of cherries) seems doubtful".

The taxonomic value of many fruit characteristics, for example colour, flavour, time of ripening, is limited. Such features, judged subjectively, are difficult to interpret and harder to describe and discriminate at the level of cultivars. In practice, most identifications are the sum of small judgements, elimination and long experience.

Overall, 27 varieties of fruit were identified from the Bowcastle Farm orchards (Table 5). Comments on the varieties are given below.

Apples: The apples have been named with some certainty by members of the Marcher Apple Network, apart from the possible Belle de Pontoise. There are two apple trees in Cherry Orchard, both cropped in 2004, Charles Ross, G19, and Worcester Permain, H21. Both varieties were popular in the 1930s.

It is not known whether there was an extensive planting of apples in Old Orchard, but now only scattered trees remain. Of those with fruit, only the single apple from M3 could not be named. There were single trees each of; King of the Pippins, B8; Lady's Finger of Hereford, M2; Newton Wonder, M4; Reverend W. Wilks G3; Worcester Permain, H9; all of these trees had good crops.

In Far Orchard, there were several rows of Annie Elizabeth and Bramley's Seedling, which covered the eastern half of the area from row M, with Rival, D17 and D21, and Belle de Pontoise, D7, and they also occurred as survivors in row D. Apart from the Bramley's, all trees had reasonable crops.

Cherries: The varieties were those mentioned by Mr Clifford Evans of Bark Hill Bewdley, in 1979, and refer to Cherry Orchard. These trees matched variety descriptions but many trees had no fruit and some trees had gone since 1979. Only two or three trees had anything like a crop, many had only a dozen or so fruits left by the birds even though most trees, even those nearly dead, carried a fair amount of blossom which clearly did not set. All the varieties listed are sweet types. These are of two kinds; varieties with firm flesh, called the Bigarreaus, eg Napoleon and varieties with soft flesh, called the Hearts, eg Black Eagle, Elton. All would have been typical commercial varieties during the 1930s. Elton, Napoleon and Roundel varieties were found in Far Orchard.

Damsons: All damsons were in Far Orchard. Most carried fruit, but one or two very old and decayed trees occurred in among the apples and cherries, as if from a former generation. Shropshire Prune is a fairly secure identification and all were the same variety.

Pears: All pears were in Old Orchard. Three trees, C11 (possibly The Rock Pear, a perry pear), J9 and J10, (Winter Nélis) had good crops of small brown conical or bergamotte shaped fruits, which dropped in early October. The most striking fruit was on a large tree with a good crop of pyriform fruit, D9, with a strong pink flush and sweet taste and this was Burré Clairgeau. Another pear variety identified was Seckle, D8, but the most commonly planted trees were Doyenné du Comice (six trees) and Pitmaston Duchess (eight trees). Average girth of the five largest pear trees was 1.57m. giving a radius of 0.25m and an annual growth increment, over a maximum of 134 years, of 1.9mm. Such a growth rate is realistic bearing in mind that the trees would grow more rapidly when young and at the present age,

growth would be minimal. Thus the largest trees could be remaining from those first planted after 1870. A count of growth rings from cut trunks would be necessary to clarify the age of the trees.

Table 5 Fruit varieties, some of which are provisional and subject to final identification

Apples	Cherries	Pears
Annie Elizabeth Bramley Belle de Pontoise? Charles Ross King of the Pippins Lady's Finger of Hereford Newton Wonder Reverend W. Wilks Rival Worcester Permain	Bradbourne Black Black Eagle Black Elton Black Oliver Eagle Early Rivers Elton Napoleon Roundel Smokey Dun	Doyenné du Comice Pitmaston Duchess Seckle Burré Clairgeau Winter Nélis The Rock Pear? (Perry) **Damsons** Shropshire Prune

5.2.5 Comparisons of Vitality Scores between orchards: averages

The average Vitality Scores for all the trees in each orchard were calculated to see if they might serve as a summary score for the orchard as a whole and may perhaps be useful for comparing one orchard with another. The numbers of trees in each orchard (Table 2) and the totals of the Vitality Scores of all the trees in each orchard were used to calculate the average Vitality Score for each orchard (Table 6 below). The meaning that can be attached to the averages for each orchard needs further consideration. Averages compress data into single values and do not indicate the range in values within the population. It was decided to calculate frequencies for classes based on the Vitality Scores as an alternative measure (see section 5.2.6 below).

Table 6 Average Vitality Score for each orchard

	Cherry Orchard	Old Orchard	Far Orchard
Total of Vitality Scores from all trees	454	277	728
Number of trees	79	37	144
Average Vitality Score	5.8	7.5	5.1

5.2.6 Comparisons of Vitality Scores between orchards: frequencies

The frequency of occurrence of each Vitality Score within an orchard allows the 'age / stage' structure within the orchard to be examined and the population structure of the fruit species to be seen (Table 7). The results show that Far Orchard had the lowest frequencies of mature trees in a reasonable state of health (Scores 9 and 10). Only 6% of the trees were in this state in Far Orchard as compared to 13% in Cherry Orchard and 33% in Old Orchard (to the nearest 1%). Pear trees were the most abundant tree species in Old Orchard and were at most 134 years old. Table 7 shows that 41% of the pear population had Vitality Scores of 9 or 10. Pear is relatively long-lived, possibly surviving 200-300 years. Cherry, which formed the bulk of the trees in the other orchards, is less long-lived, generally surviving less than 100 years, so the different 'Vitality' states of the three orchards are not unexpected. The cherries in Far Orchard were in a notably poor state, only 3% having Vitality Scores of 9 or 10 (Table 7).

The quantity of trees in particular states and the abundance of veteran tree features may be related to particular species assemblages such as saproxylic invertebrates and abundance of hole-nesting birds. These possible relationships are explored in more detail in section 23 below. Knowledge of the structure of the tree population and its state is also useful for orchard managers who are planning restoration work.

Table 7 Frequencies of Vitality Scores in each orchard and for fruit species

Number of trees	**Vitality Score**										
Orchard	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Cherry Orchard	7	3	10	4	5	10	22	8	8	2	79
Old Orchard			1		3	6	12	4	9	4	39
Far Orchard	17	15	18	3	10	31	33	8	6	3	144
Species											
Cherry Orchard cherries	7	3	10	4	5	10	21	8	7	2	77
Old Orchard pear			1		2	5	6	3	8	4	29
Far Orchard damson	3		1			3	9	2			18
Far Orchard apple	2	3	4		1	6	16	4	4	3	43
Far Orchard cherries	6	12	13	3	9	22	8	2	2		77

% of trees	**Vitality Score**									
Orchard	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Cherry Orchard	8.9	3.8	12.7	5.1	6.3	12.7	27.8	10.1	10.1	2.5
Old Orchard	0.0	0.0	2.6	0.0	7.7	15.4	30.8	10.3	23.1	10.3
Far Orchard	11.8	10.4	12.5	2.1	6.9	21.5	22.9	5.6	4.2	2.1
Species										
Cherry Orchard cherries	9.1	3.9	13.0	5.2	6.5	13.0	27.3	10.4	9.1	2.6
Old Orchard pear	0.0	0.0	3.4	0.0	6.9	17.2	20.7	10.3	27.6	13.8
Far Orchard damson	16.7	0.0	5.6	0.0	0.0	16.7	50.0	11.1	0.0	0.0
Far Orchard apple	4.7	7.0	9.3	0.0	2.3	14.0	37.2	9.3	9.3	7.0
Far Orchard cherries	7.8	15.6	16.9	3.9	11.7	28.6	10.4	2.6	2.6	0.0

6 Introduction to the species results

The following sections set out the summary results for each high taxon group, along with the survey methods used and notes on species of particular interest. Appendix C gives the results by species in each group, along with information on the method of collection, the assemblage the species, if this has been assigned, and conservation status, including BAP status. The 'sample' number for each species refers to the number of records made during the survey period. A record is a unique surveyor/date/place data point. A single record may refer to one or more specimens recorded at that date and place by an individual recorder.

7 Vascular plants

7.1 Survey technique and identification

The method of collecting vascular plant records is set out in section 4.1.2, and the abundance information for each species in each orchard is given in Appendix D.

7.2 Summary of vascular plant records

Vascular Plant Statistics	TOTAL	By orchard			By method			By community			By status			
		CHERRY	OLD	FAR	MALAISE	LIGHT	MANUAL	SAPROX.	DUNG	BLOOD	RDB/IUC	NATION	UK BAP	NONE
Species	111	71	54	90	0	0	111	0	0	0	0	0	0	111
Records	215	71	54	90	0	0	215	0	0	0	0	0	0	215
Specimens	215	71	54	90	0	0	215	0	0	0	0	0	0	215

A total of 111species of plant (excluding fruit trees) were recorded during the habitat survey, representing 2.7 % of approximately 4,111 British species. None of these has current conservation status. Far Orchard had the most species, with woodland and acid grassland species being recorded in this orchard, although they only occurred at the margins of the orchard (see section 4.2.5).

8 Bryophytes

8.1 Survey technique and identification

One day was spent surveying the epiphytic flora of the fruit trees and noting bryophytes within the grassland. No attempt was made to access the main tree canopy, but trunks, low branches within reach and fallen trunks were examined.

Most of the species were identified in the field using a hand lens. Where necessary, material was collected for later identification and to serve as voucher specimens. Nomenclature follows Blockeel and Long (1998).

8.2 Summary of bryophyte records

Bryophyte Statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	Rdb/iucn	National	UK BAP	None
Species	38	27	5	23	0	0	38	0	0	0	0	0	0	38
Records	55	27	5	23	0	0	55	0	0	0	0	0	0	55
Specimens	55	27	5	23	0	0	55	0	0	0	0	0	0	55

Thirty-eight species of Bryophytes were recorded (2 liverworts, 36 mosses), representing 3.6 % of the 1,052 British species.

8.3 Community associations

Only 8 mosses and 1 liverwort were identified from the bark of trees. The majority were recorded from bare ground (19 mosses and 1 liverwort). Where there were walls, rock and concrete, another 11 mosses were found, and these were present in all 3 orchards. Twenty-two mosses and 2 liverworts were recorded from Cherry Orchard, Far Orchard produced 22 mosses and Old Orchard 13. Only 7 mosses occurred in all 3 orchards. Conditions on the ground were fairly uniform, with a closed grassland sward in which only a few species of robust bryophytes could survive. There were few anthills or other patches of disturbed soil, damp depressions, or water courses where a greater diversity of bryophytes might be expected.

The lack of epiphytic bryophytes is perhaps unexpected, compared to the results of the six orchards surveyed in the parallel English Nature project (Lush and others in prep). In two of these sites, cherry had 18 and 12 species respectively, while pear had 14 species in one site. The numbers on apple ranged from 12 to 42 species. It is possible that the history of atmospheric pollution in the Wyre Forest area (see section 3.1) may have had some effect on the epiphytic bryophytes, or perhaps some kind of historical management. For instance, caustic alkali washes were used on trees in some orchards in England in the early years of the twentieth century (Stevenson 2006).

8.4 Species of particular interest

No uncommon bryophytes were recorded in the orchards, and the list is unexceptional. Although apple is a noted host of epiphytic bryophytes, surprisingly few species from this assemblage were recorded, as noted above.

9 Fungi

9.1 Survey techniques and identification

At least five days were spent searching for fungi, starting in June with cursory searching of the fields for an hour or so. This increased from September until November when several hours were spent searching in each field. The autumn visits were timed to correspond following weather conditions suitable for fungal fruiting and recording. Generally, the period was rather dry and fruiting poor and sporadic. The survey was restricted to searching for fruiting bodies of macrofungi. Occasionally records came to light by chance (often bracket fungi on the orchards trees) whilst looking for other species.

Each field was covered systematically at a slow walk, both the orchard grassland and the trees being searched. More attention was paid to shorter grassland swards with a higher vascular plant counts as these areas were more likely to be productive for fungi, especially waxcaps. Most of the orchard trees were examined at least once especially the bole and any fallen deadwood. Boundaries were checked, particularly the hedgerows.

Whenever possible fungi were identified in the field. Some specimens were collected for closer examination following the British Mycological Society's guidance for scientific collection. The usual macroscopic characteristic features were noted such as smell, taste and colour. Digital photography was used to record some of the more unusual specimens.

Most collected specimens were checked on the same evening or stored overnight in a refrigerator and examined the following day. Spore prints were generally taken overnight. Collected specimens were identified using keys, monographs and field guides, along with chemical tests. Nomenclature follows the new Checklist of British and Irish Basidomycota (Legon & Henrici 2005) but not all fungi are covered by standard checklists. Some more critical species, where taxonomy is complex and uncertain, could not be identified.

In practice, fungi can only be recorded as fruiting bodies visible above ground. Any survey over a short time frame will only record a fraction of the species likely to be present on a site. Every species has slightly different requirements for fruiting or different fruiting strategy. In order to record the full mycota of a site recording would need to take many years throughout the seasons and may never be fully achievable. In practice surveying a site over several years is the only way to build a reasonable assessment of the fungal mycota. Many species only fruit briefly and will only appear if conditions are right for fruiting, and this may only be once in ten years. Exceptionally rare species can take 20 or 30 years before making an appearance. At well-recorded sites the cumulative increase in species may begin to level out after about 10 years.

9.2 Summary of fungus records

Fungi statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	Rdb/iucn	National	UK BAP	None
Species	43	25	7	25	0	0	43	12	5	0	0	0	1	42
Records	66	25	7	34	0	0	66	26	5	0	0	0	2	64
Specimens	66	25	7	34	0	0	66	224	97	0	0	0	2	64

The 43 species recorded represent a very minute fraction of the total British list of approximately 12,000 species.

9.3 Community associations

Only a few groups of fungi have been formally assessed by means of species assemblages in the same way as vascular plant communities. The fungi can be grouped to the habitat type where a particular fungus was found. Within the orchards three main categories can be considered being wood (live and dead), grassland and dung (coprophilous). The Bowcastle Farm orchards featured a range of species associated with these habitats. Most species were typical and common but the grassland fungi did appear to be of special note.

Grassland species in particular can be assessed with reference to the system of evaluating waxcap grasslands (Evans 2003) where a number of key indicator species can be used to assess habitat quality. The diversity of species from four taxon groups have been used to assess conservation value of sites. Indicator species in the groups *Clavariaceae*, *Hygrocybe, Entoloma and Geoglossaceae* are used. The total number of *Hygrocybe* species seen on a single visit can also be used to assess sites (Evans 2003). The grassland fungi proved to be the most interesting and important group of fungi in the orchards, with 13 *Hygrocybe*

(waxcap) species recorded. These are regarded as good indicators of habitat quality for fungal interest. Cherry Orchard had the highest number with 10 species recorded.

The number of waxcap fungi recorded, when compared to work by Rald (1985) and Vesterholt (1999), suggests that these orchards are of local importance and may approach regional importance. Evans (2003) proposes that the number of *Hygrocybe* seen on a single visit can give an idea of importance. On 3 November 2004, 8 species of *Hygrocyb*e were recorded in Cherry Orchard, suggesting potentially an assemblage of regional importance. Interestingly, Cherry Orchard appeared to have the oldest grassland of the three orchards, grassland being present in 1870 (see section 3.4.4), whereas the site of Old Orchard was mostly arable at that time and the site of Far Orchard was woodland. Evans (2003) suggests that important waxcap grasslands require a considerable period of time to develop, though information on timescales is scanty at present.

The old fruit trees in the orchards had a number of bracket fungi, both saprophytes and parasites. The bracket fungus *Ganoderma* sp.*(australe?*) occured on a number of cherry trees. This species is rare in the adjacent woodlands due to a lack of mature trees. The most frequent bracket was *Inonotus hispidus* favouring the old apple trees. A number of common deadwood fungi were recorded on fallen branches and *Phellinus pomaceus* (see below) was found on smaller branches of the fruit trees. Many trees have mycorrhizal fungi on their roots, these are the fungi that form a symbiotic relationship with the tree. Fruit trees have endomycorrhizal fungi, which do not have the obvious above-ground fruit bodies of ectomycorrhizal species, so are usually not recorded in fungus surveys like the current study.

Coprophilous fungi (growing on dung) is a large group of saprobic fungi that have a unique life cycle in that they help to break down the dung of animals. Specimens were scattered across all the fields but not as common as might be expected. This is perhaps due to the use of various cattle treatments that might prevent a rich dung flora developing, compared to the number that is found on dung of untreated or wild animals.

9.4 Species of particular interest

FUNGI with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Record	Male	Female	Unspec
Hygrophoraceae	Hygrocybe calyptriformis			Y		2	0	0	2
Fungi Counts/Totals		**0**	**0**	**1**	**1**	**2**	**0**	**0**	**2**

Fungi have been provisionally assessed using the IUCN criteria via the Provisional Red Data List (Ing 1992). The new checklist (Legon & Henrici 2005) provides some information on the status of species but it should be noted that the new Red Data list is still in preparation.

The British Mycological Society's Fungal Records Database (BMSFRD) gives the number of occurrences of individual species. The number given against 'BMSFRD' in the text below, for species of special interest identified in the site survey, represents the number of records in the UK and Ireland. The Database is not kept fully up-to-date and many historical records feature. Counts refer to records not sites. Despite some concerns the Database is the best

guide available to the rarity of British macrofungi. In general a rare macrofungus will have less than about 100 records.

Hygrocybe calyptriformis (pink waxcap) was recorded in both Far Orchard and Cherry Orchard. This is a UK BAP species listed as of low risk on the provisional Red List for Britain and is listed as endangered on the European Red Data list. Recent recording has indicated that this species is commoner than previously thought, but is still a very good indicator of species-rich waxcap grasslands. Other quality indicator species of *Hygrocybe* found included *H. aurantiosplendens*, (BMSFRD: 150), *H. flavipes* (BMSFRD: 224) and *H. irrigata.* (BMSFRD: 1027). A small number of *Hygrocybe aurantiosplendens* occurred in Cherry Orchard in species-rich short turf.

Phellinus pomaceus (BMSFRD: 269), a wood-rotting species, was found on smaller branches of fruit trees. *Taphrina pruni* was found on *Prunus spinosa* in a hedgerow at Cherry Orchard. This fungus causes fruit of *Prunus* species to elongate and become twisted in a gall-like manner, and often this is referred to as 'pocket plum'. This is apparently rare (93 recorded in BMS database) or under recorded, and can be a serious threat to the fruit of plum trees. It normally only persists for a year before disappearing.

10 Lichens

10.1 Survey technique and identification

One day was spent recording in the orchards in 2000 and the species list is included in this report as it was felt that the lichens would not have changed much during that time. It was impractical to check all trees and the upper branch epifloras. A walk through each orchard was made visiting a selection of trees. This was subjective, with the aim of checking trees of different species and aspect. Trunks and lower branches were checked where possible.

Most of the lichen taxa were identified in the field using a hand lens and chemical spot tests were used for diagnostic purposes where necessary. Critical species were collected for later determination using a microscope. Nomenclature follows Coppins (2002). Future additions and changes to the species and names among the lichen flora of Britain can be followed by visiting the web site of the British Lichen Society (www.thebls.org.uk).

10.2 Summary of lichen records

Lichen statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUC	National	UK BAP	None
Species	27	12	21	20	0	0	27	0	0	0	0	0	0	27
Records	70	12	29	29	0	0	70	0	0	0	0	0	0	70
Specimens	70	12	29	29	0	0	70	0	0	0	0	0	0	70

The 27 species of lichen recorded represent only a very small fraction of the estimated 1,800 or so currently known British species. Lichens were only recorded from the fruit trees. A few more species could probably have been added if the boundary fence posts (where present) had been examined.

10.3 Community associations

The list of epiphytic lichens was limited compared to some of the orchards surveyed in the English Nature project (Lush and others in prep). The predominance of cherry as the main tree species in the Bowcastle Farm orchards is unlikely to be the reason, as the richest lichen site in the English Nature survey was a cherry orchard. The critical factor is probably the history of air pollution in the area. Hawksworth and Rose (1970) showed that the Birmingham area was in a zone with the greatest levels of sulphur dioxide pollution in England and Wales, and contained the fewest numbers of epiphytic lichen species. No lichens of special interest were recorded in the Bowcastle Farm orchards.

11 Amphibians

11.1 Survey technique, identification and habitat association

Likely amphibian habitats in the orchard were searched and both species found were under cherry logs in Far Orchard. It is not unusual to find newts some distance from water as they spend most of the year on land. The individuals found in Far Orchard would be using water sources outside the orchards for breeding.

11.2 Summary of amphibian records

Amphibian statistics	TOTAL	By orchard			By method			By community			By status			
		CHERRY	OLD	FAR	MALAISE	LIGHT	MANUAL	SAPROX.	DUNG	BLOOD	RDB/IUCN	NATIONA.	UK BAP	NONE
Species	2	0	0	2	0	0	2	0	0	0	1	0	1	1
Records	2	0	0	2	0	0	2	0	0	0	1	0	1	1
Specimens	2	0	0	2	0	0	2	0	0	0	1	0	1	1

Two species out of the 7 British Amphibia were recorded, a very high proportion of the total.

11.3 Species of particular interest

AMPHIBIA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Record	Male	Female	Unspec
Salamandridae	Triturus cristatus (Great-crested Newt)	LR(cd)		Y		1	0	0	1
	Amphibia Counts/Totals	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**1**

Triturus cristatus (great-crested newt) is rare across the UK (the reason for its BAP status) although still widely distributed in Worcestershire. The species is found regularly in and around the Wyre Forest, but never in large numbers.

Triturus helveticus (palmate newt) is a declining species nationally. It is rare in Worcestershire but locally common in and around the Wyre Forest where it is the most frequently recorded newt.

12 Birds (Aves)

12.1 Survey techniques and identification

Two dawn visits were made in May and in June to carry out a Breeding Bird Census in line with the British Trust for Ornithology guidelines. This involved a slow walk around each orchard recording all birds heard and seen within the confines of the orchard boundaries including the hedges. Birds flying over were noted where they may have been aerial feeding on insects from the orchards, eg, swallows flying low over the grass between the orchard trees. Notes were taken about bird behaviour where it was of interest eg. courtship behaviour, an adult carrying food, a bird feeding or taking food into a nest. All birds were identified in the field using knowledge of bird song and calls, and viewed with binoculars where necessary. Incidental bird observations were also made by a number of recorders during daytime visits to the orchards and additional records were collected at night during moth-trapping sessions.

12.2 Summary of bird records

Bird Statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	33	16	11	24	0	0	33	0	0	0	0	11	1	22
Records	95	25	16	54	0	0	95	0	0	0	0	29	3	66
Specimens	113	26	17	70	0	0	113	0	0	0	0	42	3	71

The 33 species recorded represent approximately 6 % of the 572 UK bird species.

12.3 Community associations

The presence of deadwood in the orchards is of importance to some bird species for breeding and for feeding, although birds are not included in the "SAPROX" column in the summary table in 12.2 or in Appendix C.

The following species were confirmed as breeding in holes in fruit trees:

- Lesser spotted woodpecker *Dendrocopos minor*
- Great spotted woodpecker *Dendrocopos major*
- Great tit *Parus major*
- Blue tit *Parus caeruleus*
- Redstart *Phoenicurus phoenicurus*
- Jackdaw *Corvus monedula*

The following species were likely to have been breeding as they were seen frequently in the orchards during the breeding season, although nest holes were not found:

- Spotted flycatcher *Muscicapa striata*
- Little owl *Athene noctua*

The quantity of trees in old age, with plenty of dead wood, resulted in good numbers of holes being present. Far Orchard in particular had an abundance of holes (see Appendix E). The holes in mature trees also provided a wide range of roosting sites. A green woodpecker *Picus viridis* was accidentally disturbed from one during a moth-trapping session. The invertebrates in the dead wood would have also provided a source of food for the great and lesser spotted woodpeckers.

The summer migrant birds recorded, namely spotted flycatcher, cuckoo, swallow, chiffchaff, willow warbler, blackcap, lesser whitethroat and redstart, all depend on the presence of insects for food for themselves and for their nestlings.

Insects breeding in the fruit tree canopy would have provided an important source of food during the summer for birds like blue tit, great tit, wren, long-tailed tit, great and lesser spotted woodpeckers, as well as swallows and spotted flycatchers which specialise in catching insects whilst flying.

Invertebrates present in the grassland and surrounding vegetation would have provided food for birds such as jackdaw, carrion crow, pheasant, starling, blackbird, mistle thrush, robin, red-legged partridge, wren and little owl. The presence of dung as a breeding site for invertebrates would also have provided a food source.

Redwings, which were recorded in February (see Appendix C), are migrants to the area in the autumn and winter and feed on fallen fruit in orchards and on hedgerow fruits and berries, as do resident birds such as greenfinch, goldfinch, chaffinch, nuthatch, woodpigeon and jay.

Hedgerows surrounding the orchard were important breeding sites for some birds, such as dunnock, blackbird, lesser whitethroat, wren and chaffinch.

Many of the birds recorded, especially from Far Orchard, would also have been using the adjacent woodland, in addition to the orchard, for feeding and breeding.

12.4 Species of particular interest

BIRDS with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec
Cuculidae	Cuculus canorus (Cuckoo)		Amber			1	0	0	1
Hirundinidae	Hirundo rustica (Swallow)		Amber			6	0	0	7
Muscicapidae	Muscicapa striata (Spotted Flycatcher)		Red	Y		3	0	0	3
Picidae	Dendrocopos minor (Lesser Spotted Woodpecker)		Red			3	0	0	3
	Picus viridis (Green Woodpecker)		Amber			5	0	0	6
Prunellidae	Prunella modularis (Dunnock)		Amber			1	0	0	1
Sturnidae	Sturnus vulgaris (Starling)		Red			1	0	0	1
Sylviidae	Phylloscopus trochilus (Willow Warbler)		Amber			1	0	0	1
Turdidae	Phoenicurus phoenicurus (Redstart)		Amber			2	0	0	2
	Turdus iliacus (Redwing)		Amber			1	0	0	12
	Turdus viscivorus (Mistle Thrush)		Amber			5	0	0	5
Aves Counts/Totals		**0**	**11**	**1**	**11**	**29**	**0**	**0**	**42**

Spotted flycatcher (*Muscicapa striata)* is designated a species of European Conservation Concern and is a UK Biodiversity Action Plan species. Recently published national survey information shows the population of species has declined between 36% and 70% between the 1980s and 2003-4 (Eaton and others 2006). It is becoming increasingly rare in the region but still breeds in several of the orchards in the Wyre Forest. Lesser spotted woodpecker (*Dendrocopos minor*) is also a Red List species. It has also suffered major declines in populations, between 44% and 59% between the 1980s and 2003-4 (Eaton and others 2006). Traditional orchards may be of particular value for conserving this species. It was noted for its association with old orchards in Worcestershire over 50 years ago (Harthan 1947), but it is only recently that the importance of the habitat for the species has begun to be recognised. Work on the species in Germany indicates that orchards there are better quality breeding habitat for the species than deciduous woodland (Höntsch 2005).

It was of interest to note that the house sparrow *(Passer domesticus),* song thrush *(Turdus philomelos),* and stock dove *(Columba oenas)* were not recorded in the orchards, even though the habitat appeared suitable.

13 Mammals

13.1 Survey techniques and identification

Most of the records were casual sightings of the mammal or of their diagnostic presence, like droppings, however the small rodents were trapped. Bats were sound-recorded and the resulting sonograms analysed. This is the only way to identify bats other than in the hand but it is still not specific enough for identifying the Myotid bats.

13.2 Summary of mammal records

Mammal statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUC	National	UK BAP	None
Species	13	6	2	12	0	0	13	0	0	0	0	0	1	12
Records	29	9	3	17	0	0	29	0	0	0	0	0	4	25
Specimens	31	9	3	19	0	0	31	0	0	0	0	0	4	27

A total of 13 species was recorded, representing 15 % of the 85 British land- and fresh-water mammals. These included grey squirrel, fox, fallow deer, rabbit, yellow-necked mouse, field mouse, bank vole, badger, mole, noctuelle bat, pipestrelle bat (45 KHz), pipestrelle bat (55 KHz) and an unidentified bat species of the genus *Myotis*.

13.3 Community associations

Bats roost in holes in trees, of which there were many in the orchards. However, all bats recorded were on feeding flights and no effort was made during this study to find roosts, breeding colonies or winter hibernation sites. Interestingly, there was a strong presence of Myotid bats in Cherry Orchard and in the farm barn on the 7 August. These bats were probably whiskered or Brandt's bats. Both species of pipistrelle bat were recorded and were particularly active in the Far Orchard. The noctule bat is a high flying bat and although recorded over the Far Orchard, was above tree level.

13.4 Species of particular interest

MAMMALIA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec
Vespertilionidae	Pipistrellus pipistrellus			Y		4	0	0	4
Mammalia Counts/Totals		**0**	**0**	**1**	**1**	**4**	**0**	**0**	**4**

Although *Pipistrellus pipistrellus*, the pipistrelle bat (45 KHz) is still the commonest and most widespread bat in the UK, the National Bat Colony Survey has indicated that there has been a big decline in numbers recently, perhaps as much as 70% between the years of 1978 and 1993 and it has been made a Biodiversity Action Plan species. It is still regularly seen in and around the Wyre Forest in small numbers.

14 Beetles (Coleoptera)

14.1 Survey technique and identification

The majority of the 862 records (85%) came from malaise trap samples, the remainder arising from manual sampling by searching plants (foliage, under bark etc.) and soil/dung in the orchards. No beetles were recorded from the light traps. The proportion of the fauna (5.6%) recorded is significantly lower than that of some other insect orders (eg Diptera, Lepidoptera

and Hemiptera), probably because malaise trapping is not as efficient at sampling Coleoptera. The method relies on intercepted flying specimens moving upwards towards bright light, whereas many Coleoptera tend to fall towards the ground in such circumstances. A larger number of species would almost certainly have been recorded if water traps and/or pitfall traps had also been employed on a continuous basis.

Notwithstanding the remarks above, some species were reported to be present in considerable numbers in the malaise trap samples, notably *Meligethes* spp. (pollen beetles), *Anaspis* spp. (tumbling flower beetles) and flea beetles of several genera. Surprisingly, none of the species recorded by manual sampling was found in the malaise trap samples except for larvae of *Magdalis barbicornis* which was reported to have been observed in rosaceous trees, but no formal records were submitted.

All specimens found were identified by WFSG specialists or by the Dr Peter Sidmore who studied some of the malaise trap samples. While a few species were identified only to species groups or aggregates, no major groups were ignored or left unidentified due to lack of expertise or excessive difficulty.

14.2 Summary of Coleoptera records

Coleoptera statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	230	153	37	145	181	0	94	50	13	0	2	13	1	215
Records	732	349	37	346	586	0	146	149	26	0	4	19	1	709
Specimens	862	416	37	409	654	0	208	172	26	0	6	19	3	837

The 230 species of Coleoptera (Insects - Beetles) which were recorded represented approximately 5.6% of the total currently known UK beetle fauna. The Coleoptera were the third largest high taxon group recorded during the survey.

14.3 Community associations

The high numbers of orchard trees with well-developed veteran tree features provided an abundance of wood-decay habitats for specialist species which depend upon them (saproxylic species). Fifty of the 230 recorded species (22% of the total) are included in Alexander's list of species associated with living and decaying timber (Alexander 2002). Among these 50 Coleoptera species were 5 Indicators of Ecological Continuity (IEC), ie species thought to be associated with continuity of tree cover in the landscape through time (Alexander 2004). These species at Bowcastle Farm included two species (see section 14.4 below) with the strongest association with habitat continuity (graded IEC 1). Far Orchard had the highest numbers of saproxylic Coleoptera, 4 of which are Indicators of Ecological Continuity, while Cherry Orchard and Old Orchard each had one Indicator species.

Thirteen (6%) of the Coleoptera recorded species are reported by Skidmore (1991) to be part of the cattle dung community, including 8 species of rove beetle (Staphylinidae).

14.4 Species of particular interest

COLEOPTERA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec
Cerambycidae	Anaglyptus mysticus		N			1	0	0	1
Chrysomelidae	Mniophila muscorum		N			1	0	0	1
Cleridae	Tillus elongatus		N			2	0	0	2
Curculionidae	Magdalis barbicornis		N			3	0	0	3
	Magdalis cerasi		N			1	0	0	1
	Rhinocyllus conicus		N			1	0	0	1
Dermestidae	Aderus oculatus		N			1	0	0	1
	Megatoma undata		N			1	0	0	1
Eucnemidae	Melasis buprestoides		N			2	0	0	2
Melandryidae	Abdera quadrifasciata		N			1	0	0	1
Scarabaeidae	Gnorimus nobilis	V		Y		1	0	0	3
Scolytidae	Scolytus mali		N			2	0	0	2
Scraptiidae	Mordellistena neuwaldeggiana	RDBK				3	0	0	3
Staphylinidae	Astenus immaculatus		N			1	0	0	1
Tenebrionidae	Prionychus ater		N			2	0	0	2
	Coleoptera Counts/Totals	**2**	**13**	**1**	**15**	**23**	**0**	**0**	**25**

A high proportion of the species of special interest are saproxylic (12 out of 15), emphasising the importance of this habitat at Bowcastle Farm.

Gnorimus nobilis (IEC 1), the noble chafer, is undoubtedly the most important species recorded during the Bowcastle Farm orchard survey. This priority BAP species is currently classed as Vulnerable. It has been rare in Britain for over a century, but appears to have undergone considerable decline in range, although it is present in a number of orchards around Wyre. Recent records other than from this area are from the New Forest in Hampshire and from orchards near Evesham and also in Oxfordshire, Gloucestershire and Herefordshire. It appears to occur almost exclusively in traditional orchards though has also been recorded in pasture woodland. The larvae develop in rotting wood and wood mould from old standing trees, especially fruit trees (plum, apple, pear, damson and cherry), but also willow and oak (one record). The normal development period seems to be two years in fruit trees.

Three specimens, believed to have freshly emerged from a rotting wood section, were observed and photographed on the trunk of an old cherry tree in the Far Orchard by K. McGee on 7 June 2004.

Mordellistena neuwaldeggiana is a species that, until relatively recently, had only been recorded from a small number of sites across the south and east of England. However, since 1991, it has been recorded from at least six sites in Worcestershire. Most records are from relict old forest or wood pasture. It has been reared from hornbeam and field maple logs. Adults are found at flowers.

Anaglyptus mysticus is widespread but local in England and Wales. Larvae develop in dry, dead wood. The species has been recorded from a variety of tree species including cultivated apple.

Mniophila muscorum is widespread but local in Britain, though it is possibly under-recorded. It is phytophagous, the larvae live and develop in moss eg on tree roots.

Tillus elongatus (IEC 3) is widespread but local in England, it is also recorded in South Wales. Larvae prey on wood-boring beetles in dead wood.

Magdalis barbicornis (pear weevil) has been recorded from hawthorn, apple, medlar, pear and *Sorbus* species. The larvae feed internally in twigs and branches. It is very local but widely distributed in southern England as far north as Worcestershire and North Lincolnshire. Three specimens from the malaise trap in Far Orchard may be associated with the apple trees there.

Magdalis cerasi is widespread but local in central and southern England, and is more scarce further north. The phytophagous larvae have been recorded from dead twigs and small branches of oak and rosaceous trees including pear, apple, blackthorn, hawthorn and rowan.

Rhinocyllus conicus is very local and until recently only known from coastal southern England. It has recently been recorded from several sites in Worcestershire. It is phytophagous and it is reported to be associated with various species of thistle on open grassland or disturbed ground. The Bowcastle Farm specimens were found on marsh thistle.

Aderus oculatus is widespread but local in England, where it occurs it can be locally common. Larvae develop in dead wood and have been recorded from red heart-rot in oak.

Megatoma undata is widespread but local in England, it is also reported in South Wales. Adults and larvae have been recorded from under the bark of dead wood on trees, with larval records from oak and sweet chestnut.

Melasis buprestoides (IEC 3) is widespread but local in England excluding the South West. It may be under-recorded because of its secretive nature. The larvae develop in dry dead wood.

Abdera quadrifasciata (IEC 1) is widely distributed but very local in England, there are recent records from only five vice-counties. It is associated with ancient broad-leaved woodland and parkland. The larvae develop in rotting wood, and have been recorded from hornbeam and oak.

Scolytus mali is widespread but local in England and also recorded in South Wales where it is found in orchards and woodland. It is particularly associated with fruit trees including apple, pear, cherry and plum. It has also recorded from hawthorn, wild cherry, plum, blackthorn, rowan and elm. The larvae are reported to develop under the bark, where they feed on the living wood.

Astenus immaculatus is widespread but local in the southern half of England and it has also been recorded in North Wales. It can be common where it is found, normally in marshy places. It has also been found in woods where it occurs in plant litter.

*Prionychu*s *ater* (IEC 3) is widely distributed but local over the southern half of England including the West Midlands and adjacent parts of Wales. It has been recorded from dead and decaying trees with records from apple, oak, ash, birch, elm, beech, and willow. The larvae develop in wood mould.

15 True flies (Diptera)

15.1 Survey techniques and identification

The vast majority of Diptera records (2,793 records representing 412 species) were obtained from malaise trap samples (see section 2.2). A few records (15 records representing 8 species) were made based on specimens attracted to the light traps. Of the 412 species from the malaise traps, 366 (89%) were not recorded by other methods. Only 29 species (7%) were not captured in one or other of the malaise traps. The remaining 95 records, apart from a few field observations of easily recognised species, were based on sampling by netting methods including both direct netting of observed specimens and general sweeping of foliage/flowers in all parts of the orchards. No attempt was made to record immature stages or to identify adults specifically emerging from fruit trees or other particular habitats within the orchards (eg by emergence trapping or searching for larvae in dead wood).

The malaise trap samples collected in 70% isopropanol were identified wet in the collecting fluid or, in a few cases, dried out and pinned to facilitate further study. Some groups (eg female Sepsidae for which thorax pollination patterns are important) proved impossible to dry out satisfactorily and generally could not be identified. Netted samples were pinned, dried and labelled.

Although efforts were made to identify specimens of as many species as possible, specimens of some particular groups of Diptera represented in the malaise trap samples could not be identified with certainty to species level and were ignored. These included representatives of several large families of mainly minute flies including Cecidomyiidae (gall and fungus midges - 620 British species - many associated with rotting wood and fungi), very large numbers of Psychodidae (owl midges - 94 British species - larvae in dung or decaying material) and Ceratopogonidae (minute biting midges - 160 British species - larvae of many associated with rotting vegetation). A few specimens of Chironomidae (non-biting midges - 589 British species) were identified in the early samples, but the work on this family proved so time-consuming that it was discontinued. Phoridae (scuttle flies - 315 British species - larvae in decaying animal or plant material) were numerous in the malaise trap samples with an amazing range of species reported to be present. However, identification of species of this family is difficult, time-consuming and requires particular specialist expertise; no attempt was made to process this material.

Voucher specimens were retained of scarce, unusual or difficult-to-identify species.

15.2 Summary of Diptera records

Diptera statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	IUCN(RDB)	National	UK BAP	None
Species	659	429	17	512	642	8	70	126	78	10	3	19	0	637
Records	2903	1290	22	1591	2793	15	95	541	618	16	4	39	0	2860
Specimens	8539	3754	45	4740	8342	41	156	1056	2594	18	4	52	0	8483

The Diptera (Insects - True Flies) was the largest high taxon group recorded during the survey, both in terms of numbers of species found (659) and in numbers of records made (2,903), the former representing almost 10% of the total currently known UK fauna of 6,830 species. The records include representatives of 65 of the 102 families currently recognised in Britain.

15.3 Community associations

Among the 659 Diptera species recorded were 126 (19%) listed by Alexander (2002) as being particularly associated with living or (in most cases) decaying timber, underlining the significance of this habitat in the orchards. Other species are probably associated with decaying plant material. Many of these (eg fungus gnats of various families, particularly Mycetophilidae and Sciaridae) are actually associated with fungi which are themselves associated with decay of wood or plant material.

At least 78 of the recorded species are known to be associated with cow dung (Sepsidae, Scathophagidae & Sphaeroceridae), and are doubtless mostly present as a result of the cattle grazing in the orchards. The same cattle are likely to be the main food source for the adults of several of the ten species of bloodsucking flies, including 3 species of horse flies (Tabanidae), also recorded. These groups, which are associated with the presence of grazing animals, together comprise 13% of the total species recorded.

15.4 Species of particular interest

The proportion of recorded species are currently regarded as worthy of special conservation status is small (2%). Out of a total of 23 species which have appeared in the Insect Red Data Book and subsequent reviews, 9 have proven to be more widely distributed then previously thought and have been declassified in recent reviews. Further changes may be expected when publication of the current series of reviews are completed. Nine of the 14 rare species are saproxylic species, again demonstrating the importance of this habitat.

DIPTERA with current status		Status				Counts		Specimens		
Family	Species	Review Year *	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec.
Asilidae	Choerades marginatus	1991		N			2	0	2	0
Drosophilidae	Stegana coleoptrata	2006*		NS			1	0	1	0
Fanniidae	Fannia gotlandica	1991		N			1	0	1	0
Hybotidae	Oedalea apicalis	2005		NS			1	0	1	0
Keratoplatidae	Keroplatus testaceus	2005		NS			1	0	1	0
Lauxaniidae	Cnemacantha muscaria	2006*	NR				1	1	0	0
Muscidae	Hydrotaea meridionalis	1991	NR				1	1	0	0
	Phaonia exoleta	1991	NR				2	0	2	0
	Phaonia siebecki	1991		N			1	0	1	0
Mycetophilidae	Boletina villosa	2005		NS			1	1	0	0
	Grzegorzekia collaris	2005		NS			1	0	0	1
	Sciophila geniculata	2005		NS			6	9	0	0
	Norellia spinipes	1991		N			1	0	1	0
Scathophagidae										
Syrphidae	Xylota abiens	2006*		NS			1	0	1	0
Counts/Totals			**3**	**11**	**0**	**14**	**21**	**12**	**11**	**1**

DIPTERA declassified in recent reviews		Previous Status				Counts		Specimens		
Family	Species	Review Year *	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec.
Chloropidae	Trachysiphonella scutellata	2006*		N			1	0	2	0
Hybotidae	Euthyneura halidayi	2005		N			3	0	12	0
Hybotidae	Platypalpus aristatus	2005		N			1	1	0	0
Mycetophilidae	Boletina nitida	2005		N			1	0	0	1
	Boletina rejecta	2005		N			1	0	0	1
	Exechia pseudofestiva	2005		N			6	0	0	6
	Mycetophila strigata	2005		N			1	0	0	1
	Sciophila nonnisilva	2005		N			9	0	0	9
Syrphidae	Eumerus ornatus	2006*		N			1	1	0	0
Counts/Totals			**0**	**9**	**0**	**9**	**24**	**2**	**14**	**18**

* An asterisk after the review year indicates that the reported status is provisional, ie taken from a review that is nearing completion but not yet published.

Choerades marginatus is robberfly species of ancient (usually oak) forests and has been recorded previously from the Wyre Forest. The larvae are believed to develop in beetle burrows beneath bark or within deadwood. They are probably predatory on beetle larvae.

Stegana coleoptrata is a species for which there are sparse records widely distributed over Britain, mostly associated with birch woods with dead or diseased old trees. It has also been recorded from mixed woodland.

Fannia gotlandica is a Southern species (this may be the most northerly British record) associated with dead wood and old or damaged trees in broadleaved woodland. The larvae develop in wood detritus and rotting wood of trees including elm and beech. This species is known only from Britain and Sweden.

Oedalea apicalis is a species from rotten wood. It has been recorded in the vicinity of dead and decaying beech trees and also on a *Cossus*-infested oak.

Keroplatus testaceus is a fungus gnat associated with old broad-leaved woodland supporting large bodies of damp rotten wood, usually with bracket fungi. The larvae live on the underside of logs bearing encrusting fungi or beneath the brackets of polypore fungi.

Cnemacantha muscaria is a species with sparse and widely scattered records including Llanymynech Hill in Shropshire. Its habitat requirements are unclear with records from riverside vegetation, scrub on limestone and upland grassland. It has been taken in a malaise trap in Windsor Forest.

Hydrotaea meridionalis has widely scattered records from England and Scotland. There are only 5 post 1960 sites, the most northerly being in Oxfordshire. It is found in old broadleaved woodland and adjacent pastures. The larvae have been reared from cow dung in mainland Europe, where they are predators of other Diptera larvae. The adult females are attracted to large mammals and feed on sweat.

Phaonia exoleta was found amongst a sample taken in a malaise trap in the Far Orchard on 15/05/2004. This is a species of rotting wood and elsewhere has been bred from rotting elm. It is a southern species that has been recorded as far north as Nottinghamshire and Aberystwyth.

Phaonia siebecki is a woodland species limited to Southern England with records extending as far North as Nottinghamshire.

Grzegorzekia collaris is a fungus gnat found in damp broadleaved woodland with a good supply of rotting wood and is known from 19 sites nationally post-1990. The larvae have been found in damp rotting wood.

Sciophila geniculata is a fungus gnat which has been recorded from 10 widely-dispersed British sites including both woodland and boggy areas. Adults have been found around old beeches.

Norellia spinipes may be a recent arrival in Britain. First recorded in 1965 in southern England it appears to have been spreading north. It is known to be associated with daffodils and a single specimen was captured by a malaise trap placed in the Cherry Orchard close to the garden of Bowcastle Farm in springtime.

Xylota abiens is a scarce hoverfly associated with dead wood. The larvae have been found under the bark of partly submerged logs close to the water line and are also reported from decaying beech stumps.

One particular species, although not considered at risk, is worthy of particular mention. *Xylophagous ater* (Xylophagidae) is confined to damp ancient woodland sites where its predaceous larvae are found under the bark or in rotting wood of trees (eg oak, beech, birch, ash). Adults are rarely encountered but, most surprisingly, several specimens were found in malaise traps in both Cherry and Far Orchards.

16 True bugs (Hemiptera)

16.1 Survey techniques and identification

The survey methods and results were similar to Coleoptera. The majority of records (90%, representing 73% of the species) came from malaise trap samples, some species being present in large numbers. The proportions of records and species recorded by manual sampling were almost identical to those for Coleoptera.

16.2 Summary of Hemiptera records

Hemiptera Statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	92	57	5	69	83	0	22	0	0	0	0	2	0	90
Records	361	161	6	194	330	0	31	0	0	0	0	2	0	359
Specimens	684	352	6	326	649	0	35	0	0	0	0	2	0	682

The 92 species recorded represent nearly 9% of the 1,050 total species recorded in the UK.

16.3 Community associations

Most Hemiptera species are plant feeders. The species found included heteropterans (shield bugs, capsid bugs, ground bugs and flower bugs) and homopterans including planthoppers, leafhoppers, froghoppers and psyllids. None of the species recorded are associated with deadwood or dung.

16.4 Species of particular interest

HEMIPTERA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Record	Male	Female	Unspec
Cixiidae	Oliarus panzeri		N			1	0	0	1
Miridae	Amblytylus brevicollis		N			1	0	0	1
	Hemiptera Counts/Totals	**0**	**2**	**0**	**2**	**2**	**0**	**0**	**2**

Oliarus panzeri, a lace-winged planthopper, is very local in the southeast of England but has been recorded as far northwest as Oxfordshire. The nymphs are believed to be root feeders. The optimal sites for the insect are probably poorly drained corners of pastures close to hedges utilised by the adult insects. The Bowcastle Farm specimen was found in a malaise trap sample from Far Orchard.

Amblytylus brevicollis is a grass-feeding capsid bug which is very local from Scotland to southern England with few recent records. The typical habitat is dry grassland. The Bowcastle Farm specimen was found in a malaise trap sample from Cherry Orchard.

17 Bees, wasps, ants and allies (Hymenoptera)

17.1 Survey techniques and identification

As was the case with the Diptera, the vast majority of the records (538 = 91%) were obtained obtained from the malaise trap samples, the remainder (51 records) from hand sampling, by net-sweeping vegetation, collection from flowerheads and rotting fruit, by the identification of wasp-induced plant galls, observation of anthills, and from searching exposed root plates

of fallen fruit trees. The relatively small number of records generated by hand collection may have been due to adverse weather conditions which were cold and windy during several of the 13 recording visits, and the fact that there were few suitable flowering plants to supply nectar and pollen in much of the orchard grasslands.

Of the 42 species recorded manually, only 22 (52%) were also recorded from the continuously-running malaise traps indicating that a significant number of Hymenoptera species may not be accounted for by malaise trap sampling alone. It is considered that a significant number of additional species might have been recorded by other trapping methods (eg pitfall traps and high sweeping in fruit tree blossom).

Identification of many Hymenoptera is difficult and can only be performed by experienced specialists in their particular groups. While some groups (eg most Aculeata) could be identified by WFSG's own members, specialist assistance was sought for identification of Symphyta and the Parasitica (where conserved – see note below).

The malaise trap samples were collected in fluid (70% isopropanol). Hymenoptera were sorted and sent to appropriate specialists for identification. Where possible, they were identified wet in the collecting fluid or, in a few cases, pinned and dried out to facilitate further study. However, large numbers of minute Parasitica were reportedly present in most of the malaise trap samples and these were not identified. The actual number of species present was therefore obviously far greater than the number actually recorded. Samples collected in the orchards were identified in the field or, where necessary pinned, dried and labelled for later identification.

17.2 Summary of Hymenoptera records

Hymenoptera Statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUC	National	UK BAP	None
Species	220	125	4	156	200	0	42	25	0	0	3	9	0	208
Records	589	255	4	330	538	0	51	57	0	0	9	16	0	564
Specimens	1092	468	4	620	1036	0	56	69	0	0	10	19	0	1063

The Hymenoptera (bees, wasps, ants and allied species) were represented by 220 recorded species, making it the fourth largest high taxon group in terms of species found at Bowcastle Farm. The numbers of recorded species from each of the three main groups were as follows:

Group	Approx. UK species count	Orchard species recorded	% of UK species Found
Symphyta (sawflies)	490	37	7.6
Apocrita Parasitica (Parasitic Wasps)	5480	84	1.5
Apocrita Aculeata (Bees, Wasps & Ants)	580	102	17.6
Totals	**6550**	**223**	**3.4**

17.3 Community associations

Of the 220 species Hymenoptera species recorded, 25 (11%) are listed by Alexander (2002) as being particularly associated with living or (in most cases) decaying timber. A large number of species are parasites of various kinds on other insects and some are plant-gall causers.

Many of the solitary bees and wasps nest in dead wood, holes in the ground, or in plant stems. The beetle holes in the dead trees might would be utilised as nest holes for some species. Although there was little bare ground, where the old fruit trees had toppled, the exposed root plate provided opportunities for courtship and the excavation of nest holes. Hornets and honey bees often utilise old rot holes and woodpeckers holes in Wyre orchards.

The life histories of a number of the ichneumons are known. For instance, *Schzopyga circulator* and *S. frigida* seem to target spiders of the genus *Clubiona.* The *Tromatobia* and *Zaglyptus* species have been found to have similar predilections.

Given the specialised lifestyles and high trophic levels of very many parasitic hymenoptera, it can be seen that vulnerability to local extinctions is always a factor and the importance of listing even a small proportion of them in this report is therefore apparent.

17.4 Species of special interest

Saproxylic species feature quite strongly in the list of rare species, 4 out of 12 rare and scarce Hymenoptera are saproxylics, including *Lasius brunneus*, the brown ant.

To evaluate the Hymenoptera assemblage as a whole, a tentative initial site assessment was made based on the records of 102 aculeates, collected both by sweeping vegetation and malaise trapping. This assessment indicated a mean quality score of 2.5 for Cherry Orchard and Far Orchard using Archer's method (2002). In this method, species are given different scores depending on their national and local rarity. The limitations of this method must be noted as the total number of species was low and the scores would be unduly influenced by the few rare species recorded. The records came mainly from Far Orchard and Cherry Orchard whilst Old Orchard was under-surveyed. Nonetheless, the indication is that the Wyre Forest orchards are of high regional importance for Hymenoptera, being of only a little lower quality than Devil's Spittleful/Rifle Range and Hartlebury Common nature reserves. However, limitations of using quality scores were once again alluded to by Falk in his evaluation of Warwickshire quarries (2006).

Later records arising from specialist identifications of specimens of Ichneumonidae and other parasitic hymenoptera and of Tenthredinidae (sawflies) brought the total species count to 220. In many cases the status of these species remains unknown due to lack of data and they cannot yet be used for revision of the quality score.

HYMENOPTERA with conservation Status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec.
Anthophoridae	Nomada fucata		N			1	0	0	1
Colletidae	Hylaeus pictipes		N			1	0	0	1
Euceridae	Eucera longicornis		N			1	0	0	1
Formicidae	Lasius brunneus		N			4	0	0	4
Halictidae	Lasioglossum pauxillum		N			2	0	0	2
Pompilidae	Dipogon bifasciatus	NR				1	0	0	1
Sapygidae	Sapyga clavicornis		N			1	1	0	0
Sphecidae	Pemphredon morio		N			1	0	1	0
	Psen bicolor	V				3	0	2	1
Tiphiidae	Tiphia minuta		N			4	0	0	7
Vespidae	Dolichovespula saxonica	RDBK				5	0	0	6
	Hymenoptera Counts/Totals	**3**	**9**	**0**	**12**	**25**	**1**	**3**	**25**

Nomada fucata is a species that has been rapidly expanding its territory and may soon be reclassified. It is associated with a host bee species, *Andrena flavipes*, which was not recorded in this survey.

Hylaeus pictipes is recorded from a variety of habitats in southern England and soft-rock cliffs in Wales. Females collect pollen from a range of flowers.

Eucera longicornis was once widespread and locally common throughout southern England and Wales, it is now mostly restricted to coastal localities and particularly to soft-cliff sites in South West England, Kent and the Isle of Wight. Females are polylectic. In Wales, it still occurs at inland localities in Monmouthshire and on dunes and other habitats on the south coast.

Lasius brunneus is a small brown ant often associated with oak. It usually nests within decaying heartwood of old open-grown trees and is relatively frequently encountered in orchards in Gloucestershire and Worcestershire (Lush and others in prep). Once thought to be very restricted in its distribution, it is now apparently quite widespread (especially in the Wyre area). This may well be because of greater recording effort in recent times.

Lasioglossum pauxillum is a species nesting in small or large aggregations, usually on level and sparsely vegetated soil. It visits a wide range of flowers.

Dipogon bifasciatus preys on crab spiders. It is a very scarce insect indeed, with most records from the South of England.

Sapyga clavicornis is a wasp species that is a secondary parasite of *Chelostoma florisomne* (also found on site) and some *Osmia* species. It is has a scattered distribution throughout Britain but is very rarely found.

Pemphredon morio is in a genus with a number of taxonomic problems and therefore the exact distribution of several species is uncertain. *P. morio* probably preys on aphids.

Psen bicolor (*Mimesa bicolor*) usually stocks its burrows with cicadellid leafhoppers. There are few modern records, so this one at Bowcastle Farm is very significant.

Tiphia minuta burrows to find larvae of dung beetles (occasionally other beetles) and lays eggs on the paralysed hosts. The insect is now much more widely recorded and its status may come under review.

Dolichovespula saxonica is an example of a colonist that has spread rapidly throughout much of England since being first recorded in 1987. Its status is likely to be reviewed again in the near future.

In addition to the species listed above, which have been accorded formal conservation status in published reviews, the following interesting Ichneumonidae (parasitica) were recorded.

Mesoleius intermedius was first recorded in Britain as a species of fens / wet grassland. Its biology unknown but other species in the same subfamily (Ctenopelmatinae) are endoparasitoids of tenthredinid sawfly larvae.

Aclastus eugracilis is known to be an egg predator in spider egg sacs. There are also undescribed species in this group, so this identification may not stand.

Micromonodon tener, only recently recorded as British, may be more common than it appears as it is doubtless overlooked, being part of a 'difficult' group of genera. Its biology is unknown.

Poemenia collaris was once only known from one British specimen collected in 1988 but has since then increased its range in southern England. It is an ectoparasitoid of *Passaloecus* wasps (Crabronidae) in stem nests.

18 Butterflies and moths (Lepidoptera)

18.1 Survey techniques and identification

Because a large proportion of the Lepidoptera are nocturnal but attracted to light, they are best recorded using light traps overnight. Accordingly, a series of ten night visits were made by individuals over the recording period using their own light traps. Two kinds of light traps were used, Skinner mercury vapour (MV) traps and actinic traps. The table below shows the details of the light trapping programme, the numbers and locations of traps used, the number of records made (one per species per date) and the number of specimens recorded.

Light trap programme and associated Lepidoptera records																				
Date	Cherry orchard					Far orchard					Old orchard					Totals				
	MV	Actinic	Hours	Species	Specimens	MV	Actinic	Hours	Species	Specimens	MV	Actinic	Hours	Species	Specimens	MV	Actinic	Hours	Species	Specimens
28/03/2004	1	1	6	4	7	2	1	6	14	124	1	1	5	6	25	4	3	17	24	156
13/04/2004	2		5	13	38	1	1	5	13	82	1	1	5	13	31	4	2	15	39	151
10/05/2004	2		8	24	35	3	2	8	39	95	2		8	12	16	7	2	24	75	146
25/05/2004						2		7	47	122	1		7	20	42	3	0	14	67	164
28/06/2004	1		7	49	253						1		7	37	214	2	0	14	86	467
15/07/2004 a						1		5	69	259						1	0	5	69	259
15/07/2004 b						1	1	5	51	210						1	1	5	51	210
19/07/2004						2		7	85	822						2	0	7	85	822
04/08/2004						2		7	67	496	1		7	65	519	3	0	14	132	1015
07/08/2004											1	1	5	45	216	1	1	5	45	216
08/09/2004											1	1	5	17	46	1	1	5	17	46
TOTALS	6	1	26	90	333	14	5	50	385	2210	9	4	49	215	1109	29	10	125	690	3652

Although the light traps accounted for over 70% of the total species recorded, both the malaise traps (20%) and field observations/captures (10%) found significant numbers of species. Forty-four species (14% of the total recorded) were not seen at the light traps and these were mainly daytime flying species.

Observations were made of the day-time flying moths during day visits, usually near their larval foodplants. A few moth caterpillars were discovered in general searches for invertebrates on the bark of fruit trees and under logs and near fungi.

53 records of butterflies were obtained with a total of 16 species. Most of the records were daytime sightings of insects flying or nectaring on flowers, but the malaise traps provided some records, with the small white found only in the malaise trap.

Nearly all of the macromoths and many of the micromoths were identified in the field by experienced moth recorders. Some specimens were taken home for identification: a few of the pugs and one or two critical macros and some of the micros were identified by dissection of genitalia and/or microscope examination. There were many hundreds of micromoths in the malaise trap samples (in alcohol) but most of these were not easily identifiable. A few were identified after drying them out, but in the majority of cases the wing scales had become detached. Identification by genitalia dissection was impracticable on such large numbers in the time frame available.

18.2 Summary of Lepidoptera records

Lepidoptera statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	321	119	160	245	61	277	61	7	0	0	0	3	0	318
Records	962	185	239	538	179	690	93	11	0	0	0	5	0	957
Specimens	4496	575	1296	2625	348	3652	496	12	0	0	0	5	0	4491

Eighteen butterfly and 303 moth species were recorded, making a total of 321 species (11.6% of the total UK Lepidoptera fauna) making this the second largest taxon group recorded in the orchards. This group was also the second largest group in terms of numbers of records made and specimens counted.

18.3 Community associations

Only 7 of the recorded species (all moths) have larvae which live in timber, 5 in deadwood, 2 in live wood. None are dung-breeders or bloodsuckers, there are no such associations with the presence of cattle.

The larvae of at least 13 of the moth species recorded are known to feed on fruit tree foliage and are likely to be breeding within the orchards:

- *Zeuzera pyrina* Leopard moth
- *Argyresthia prunella*
- *Yponomeuta malinellus*
- *Swammerdamia pyrella*
- *Carcina quercana*
- *Pandemis corylana* (chequered fruit-tree tortrix)
- *Archips podana* (large fruit-tree tortrix)
- *Clepsis consimilana*
- *Hedya pruniana*
- *Hedya nubiferana* (marbled orchard tortrix)
- *Cydia pomonella* (codling moth)
- *Phycita roborella*
- *Cilix glaucata* (chinese character)

It is impossible to ascertain exactly which of the other moth species were using the orchards to breed or feed. Many of the moths will have been attracted in to light traps from neighbouring woodland and the farm garden.

In respect of the butterflies, it was not surprising to find those with grass-feeding larvae present in good numbers in the orchards, namely, ringlet, large skipper, small skipper, meadow brown and gatekeeper. The holly blue, speckled wood and silver-washed fritillary would have used the woodland for breeding but visited the orchard for feeding. The presence of lady's smock, birdsfoot trefoil and sheep's sorrel in the grassland would have provided food plants for the larvae of orange tips, common blues and small coppers respectively.

18.4 Species of special interest

LEPIDOPTERA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec
Noctuidae	Egira conspicillaris		N			1	0	0	2
	Enargia paleacea		N			1	0	0	2
	Parascotia fuliginaria		N			1			1
	Lepidoptera Counts/Totals	**0**	**3**	**0**	**3**	**3**	**0**	**0**	**5**

Elgira conspicillaris (silver cloud) is a fairly common resident in Worcestershire, especially along the Severn Valley, but it is absent from most of the rest of Britain. Food plants in the wild are still unknown. It was recorded in Far Orchard.

Enargia paleacea (angle-striped sallow) is an uncommon resident of Worcestershire and is absent from most of England. It is recorded fairly regularly in the Wyre Forest where the larvae feed on birch. It was found in the Far Orchard although it is assumed to have used the birch trees in adjoining woodland for breeding.

Parascotia fuliginaria (waved black) is nationally scarce although still fairly common in Worcestershire where it is resident in woodland and suburban gardens, where it feeds on fungi in dead wood. A larva was found feeding on the fungus *Stereum hirsutum* growing on a log lying on the ground in the Far Orchard.

Panemeria tenebrata (small yellow underwing) has no formal conservation status, but it was interesting to find a colony of this local daytime-flying species in the Far Orchard. The larvae feed on common mouse-ear *(Cerastium fontanum)*.

Argynnis paphia (silver-washed fritillary) is a species that has suffered a decline in the UK in the twentieth century, although appears to be increasing again in recent years. It is at the edge of its range in north Worcestershire and appears to be holding its own in the Wyre Forest where its larvae feed on violets. It was recorded on two occasions in Far Orchard, nectaring on bramble flowers.

19 Other insects

19.1 Survey techniques and identification

Almost all of the records (113 = 93%) arise from malaise trap samples, the remainder being specimens observed or captured manually during orchard visits.

19.2 Summary of records of other insects

Small insect orders statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Collembola														
Species	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Records	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Specimens	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Dermaptera														
Species	1	1	1	1	1	0	1	0	1	0	0	0	0	1
Records	36	28	1	7	33	0	3	0	36	0	0	0	0	36
Specimens	73	65	1	7	70	0	3	0	73	0	0	0	0	73
Neuroptera														
Species	5	3	0	5	5	0	1	0	0	0	0	0	0	5
Records	24	10	0	14	23	0	1	0	0	0	0	0	0	24
Specimens	33	14	0	19	32	0	1	0	0	0	0	0	0	33
Odonata														
Species	3	1	1	2	1	0	3	0	0	0	0	0	0	3
Records	4	1	1	2	1	0	3	0	0	0	0	0	0	4
Specimens	4	1	1	2	1	0	3	0	0	0	0	0	0	4
Orthoptera														
Species	1	1	0	1	1	0	0	0	0	0	0	0	0	1
Records	3	1	0	2	3	0	0	0	0	0	0	0	0	3
Specimens	3	1	0	2	3	0	0	0	0	0	0	0	0	3
Plecoptera														
Species	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Records	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Specimens	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Psocoptera														
Species	6	5	0	4	6	0	0	0	0	0	0	0	0	6
Records	46	29	0	17	46	0	0	0	0	0	0	0	0	46
Specimens	155	123	0	32	155	0	0	0	0	0	0	0	0	155
Siphonaptera														
Species	1	1	0	0	0	0	1	0	0	0	0	0	0	1
Records	1	1	0	0	0	0	1	0	0	0	0	0	0	1
Specimens	3	3	0	0	0	0	3	0	0	0	0	0	0	3
Strepsiptera														
Species	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Records	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Specimens	1	0	0	1	1	0	0	0	0	0	0	0	0	1
Trichoptera														
Species	3	1	0	3	3	0	0	0	0	0	0	0	0	3
Records	4	1	0	3	4	0	0	0	0	0	0	0	0	4
Specimens	4	1	0	3	4	0	0	0	0	0	0	0	0	4
TOTALS														
Species	23	13	2	19	20	0	5	0	1	0	0	0	0	23
Records	121	71	2	48	113	0	8	0	36	0	0	0	0	121
Specimens	278	208	2	68	268	0	10	0	73	0	0	0	0	278

All the remaining insect records not dealt with in preceding sections are included in the table. They amount to 121 records representing 23 species of 10 small orders.

19.3 Community associations

The rabbit flea *Spilopsyllus cuniculi* was found with rabbit hair that came from a rabbit stop opened by a fox or badger. It is a blood-sucking species that is not associated with the cattle-grazing regime. The one dung inhabitant (earwig, *Forficula auricularia)* is also comfortable living on decaying plant material and is therefore equally not dependant on the presence of grazing cattle.

The malaise traps collected the grasshopper *Chorthippus parallelus*, and the commonly found bark louse *Ectopsocus briggsi*.

Several species in the list belong to taxa whose immature stages (nymphs or larvae) are aquatic. These species must be associated with water outside the orchards and they comprised 3 Odonata (dragonflies), 3 Plecoptera (stoneflies) and 3 Trichoptera (Caddisflies). The farm garden contains a large ornamental pond, and a stream and small lake are located immediately adjacent to the southern boundary of the Cherry Orchard.

19.4 Species of special interest

There are no species with national conservation status amongst this group. The white-legged damselfly *Platycnemis pennipes* (Local) was discovered perching on vegetation in Far Orchard and in the malaise trap in Cherry Orchard. This species has been found increasingly in the Midlands away from its stronghold breeding area on the River Severn, even breeding occasionally in still water. *Micromus angulatus,* which has Local scarcity status, was found among the 3 species of lacewings caught in the malaise traps.

20 Spiders (Arachnida)

20.1 Survey techniques and identification

Almost all the spider records were obtained from the malaise traps in Cherry and Far Orchards. A few were found by sweeping for other groups and a few records were obtained whilst visiting the orchards at night to record moths. The dominance of malaise trap records is not surprising as no specific effort was made to survey specifically for spiders.

20.2 Summary of Arachnida records

Arachnida Statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	38	30	3	20	35	0	9	1	0	0	0	0	1	37
Records	117	66	3	48	107	0	10	1	0	0	0	0	1	116
Specimens	373	210	3	160	363	0	10	1	0	0	0	0	1	372

A total of 38 species was recorded, a little less than 4% of the British fauna.

20.3 Community associations

The numbers of records are dominated by the Linyphiid *Lepthyphantes tenuis,* which is a widespread and common lowland grassland species, and a frequent aeronaut, which perhaps explains why so many were trapped. Although the national atlas (Harvey and others 2002) shows the same sort of distribution for two other Linyphiid spiders, and they occur in the same type of habitat, both these Linyphiids (*Bathyphantes gracilis* and *Erigone atra)* were recorded less frequently than *L. tenuis*, despite showing similar behaviour.

Many of the species are common and found in the ground layer, and the low numbers collected suggest that they have tended to stay there. The Nursery Web spider, *Pisaura mirabilis* (Pisauridae), and the Linyphiid *Microneta viaria* illustrate this point.

The low count of jumping spiders (Salticidae – *Salticius scenicus and Heliophanus flavipes*) is perhaps rather surprising; one would have expected that their more active life-style would have produced more captures.

20.4 Species of special interest

ARACHNIDA with current conservation status		Status			Counts		Specimens		
Family	Species	IUCN based	Non-IUCN	UK BAP	Species	Records	Male	Female	Unspec
Araneidae	*Entelecara congenera*		N			1	1	0	0
Arachnida Counts/Totals		**0**	**0**	**0**	**1**	**1**	**1**	**0**	**0**

Entelecara congenera is well outside its previously known range as shown in the national atlas. The specimen was in poor condition, suggesting that it may have been dead for some time before getting into the collecting fluid, and there must therefore be some doubt about where it had come from.

Araneus triguttatus is an additional species if interest. The national atlas suggests that this is the most north-easterly record in recent years; it is also a new county record.

21 Centipedes (Chilopoda), millipedes (Diplopoda) and woodlice (Isopoda)

21.1 Summary of records and habitat associations

	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Chilopoda														
Species	3	1	0	2	1	0	2	1	0	0	0	0	0	3
Records	3	1	0	2	1	0	2	1	0	0	0	0	0	3
Specimens	3	1	0	2	1	0	2	1	0	0	0	0	0	3
Diplopoda														
Species	3	0	0	3	0	0	3	2	0	0	0	0	0	3
Records	3	0	0	3	0	0	3	2	0	0	0	0	0	3
Specimens	3	0	0	3	0	0	3	2	0	0	0	0	0	3
Isopoda														
Species	3	3	0	3	2	0	3	0	0	0	0	0	0	3
Records	19	12	0	7	8	0	11	0	0	0	0	0	0	19
Specimens	19	12	0	7	8	0	11	0	0	0	0	0	0	19
TOTALS														
Species	9	4	0	8	3	0	8	3	0	0	0	0	0	9
Records	25	13	0	12	9	0	16	3	0	0	0	0	0	25
Specimens	25	13	0	12	9	0	16	3	0	0	0	0	0	25

The 9 species recorded represent just 5 % of the total 183 known British species. There are no species with conservation status amongst them.

Lithobius variegatus, one of the Centipedes, is regularly found beneath bark on decaying timber. Two of the millipedes are also associated with dead wood.

22 Slugs and snails (Mollusca)

22.1 Summary of records and habitat associations

Mollusca statistics	Total	By orchard			By method			By community			By status			
		Cherry	Old	Far	Malaise	Light	Manual	Saprox.	Dung	Blood	RDB/IUCN	National	UK BAP	None
Species	9	6	0	4	0	0	9	0	0	0	0	0	0	9
Records	11	7	0	4	0	0	11	0	0	0	0	0	0	11
Specimens	11	7	0	4	0	0	11	0	0	0	0	0	0	11

Molluscs were recorded as they were encountered during survey visits for other groups. None of them have conservation status. There was no systematic investigation of soil invertebrates during study and this would have undoubtedly resulted in more mollusc records, especially of the smaller snails. The acidic nature of most of the Wyre Forest soils results in a paucity of

mollusc species and numbers locally. These small numbers of slugs and snails were typically found under rotting logs, in company with woodlice.

23 Overall analyses, summary and conclusions

23.1 Recording methods: use of malaise and light traps

Recording of invertebrates in the Bowcastle Farm orchards was dramatically enhanced by the malaise and light trapping programmes, which between them produced records of 1,281 species not recorded by other recording methods (75% of the total). There is no doubt that the malaise trapping program totally dominated the overall biodiversity survey (Appendix B2). The 1,225 invertebrate species recorded from these traps included 1,025 species (64% of the total) not found by other methods (observation, manual capture, or light trapping). The total number of species actually captured was in fact considerably higher than the number actually reported. Large numbers of small Diptera (gnats etc.), parasitic Hymenoptera and Microlepidoptera could not be identified because of lack of available expertise or sheer lack of time. Many of these species could only have been identified by time-consuming genitalia dissection or would have required the expertise of a very limited number of national experts. Some Diptera from the later malaise trap samples could not be processed in time to meet the publication deadline for this report and still await processing.

With hindsight it is regrettable that no malaise trapping was performed in the Old Orchard. Because these traps had such a profound effect on the number of species recorded from the Cherry and Far Orchards, statistical comparisons of their fauna with that of the Old Orchard would be meaningless.

A total of 285 species were recorded from the light traps, of which 216 (13.6 % of the total invertebrate count) were not recorded by other methods. One concern about using light is that flying insects might be drawn in from outside the study area and to minimise that effect, the light traps were always sited in the middle of the orchards. Bats may also have been drawn in because of the number of flying insects. It was observed that by examining the fruit trees with a torch, other records were made, particularly of spiders, beetles, slugs and woodlice.

Additional records could be made by leaving light traps on overnight, as they may then trap moths that only fly later in the night. Sweep netting at dusk would also produce records of some micromoths that do not come to light. The use of other methods such as sugaring to attract moths might also yield new records, but this was not undertaken in this study. Similarly, the use of pheremones might have produced some daytime-flying clearwing moths, but they might well have been drawn in from the surrounding area.

23.2 Assessment of the fruit tree habitat

An intensive effort was made to characterise the fruit tree habitat by recording the number and position of trees in each orchard, fruit species and varieties, average spacing and condition of individual trees. A novel rapid assessment method was developed to record condition of the trees by assigning a ‘Vitality Score’ to each tree. This comprised a 10-point scale from ‘More or less healthy’(10), ie mature trees with no signs of die back, through the stages of decline to ‘Final remains’ (1). In this way, veteran tree features such as fissured bark and hollow trunks were summarised within a single score for each tree. Examination of

frequencies of scores within each orchard allowed condition of the orchard tree population as a whole to be analysed and comparisons to be made between the orchards. The results indicated that old and senescent trees with many veteran tree features predominated in all the orchards but most markedly in Far Orchard (only 6% of the total number of trees had a score of 9 or 10, ie were of the highest 'Vitality'). Old Orchard had the greatest proportion of high 'Vitality' trees (33% of trees had a score of 9 or 10). Cherry Orchard had 13% of trees with a score of 9 or 10. Pear trees were the most abundant tree species in Old Orchard and were at most 134 years old. Pear is relatively long-lived, possibly surviving 200-300 years and 41% of the pear population had a Vitality Score of 9 or 10. Cherry, which formed the bulk of the trees in the other orchards, is less long-lived, generally surviving less than 100 years, so the different 'Vitality' states of the three orchards are not unexpected.

23.3 Biodiversity of Bowcastle Farm orchards

23.3.1 Total numbers of species

During the study a total of 6,353 individual records were collected based on sightings and/or examination of more than 16,900 specimens.

A total of 1,868 species were recorded from the three orchards, representing almost 5% of the approximately 43,000 species total of British species for the groups recorded (Table 8). The vast majority of the species recorded from the orchards (1,649) were animals, the 219 species of plants and fungi accounting for less than 1.2% of the total. The proportional representation of the vertebrates (7.5% of the British species) and invertebrates (6.9%) is remarkably similar.

The survey of the three orchards at Bowcastle Farm is the first of its kind in the UK in terms of it depth and range of recording of taxa. The results add significantly to the knowledge of the biodiversity of the traditional orchard habitat.

Table 8 Numbers of species in each orchard by taxon group

Group	Species Recorded				British SpeciesTotal	Combined % British total
	Cherry Orchard	Old Orchard	Far Orchard	Combined Total		
Vascular Plants	71	54	90	111	4111	2.7
Bryophyta	27	5	23	38	1052	3.6
Fungi	25	7	25	43	12000	0.4
Lichens	12	21	20	27	1800	1.5
Plants & Fungi	**135**	**87**	**158**	**219**	**18963**	**1.2**
Amphibia	0	0	2	2	7	28.6
Aves	16	11	24	33	572	5.8
Mammalia	6	2	12	13	61	21.3
Vertebrates	**22**	**13**	**38**	**48**	**640**	**7.5**
Coleoptera	153	37	145	230	4114	5.6
Diptera	429	17	512	659	6800	9.7
Hemiptera	57	5	69	92	1049	8.8
Hymenoptera	125	4	157	220	6550	3.4
Lepidoptera	119	160	245	321	2768	11.6
Collembola	0	0	1	1	7	14.3
Dermaptera	1	1	1	1	2	50.0
Neuroptera	3	0	5	5	75	6.7
Odonata	1	1	2	3	62	4.8
Orthoptera	1	0	1	1	30	3.3
Plecoptera	0	0	1	1	42	2.4
Psocoptera	5	0	4	6	89	6.7
Siphonaptera	1	0	0	1	68	1.5
Strepsiptera	0	0	1	1	16	6.3
Trichoptera	1	0	3	3	235	1.3
Arachnida	30	3	20	38	869	4.4
Chilopoda	1	0	2	3	50	6.0
Diplopoda	0	0	3	3	55	5.5
Isopoda	3	0	3	3	77	3.9
Mollusca	6	0	4	9	236	3.8
Invertebrates	**936**	**228**	**1179**	**1601**	**23194**	**6.9**
Animals	**958**	**241**	**1217**	**1649**	**23834**	**6.9**
TOTAL	**1093**	**328**	**1375**	**1868**	**42797**	**4.4**

23.3.2 Habitats and species assemblages

The orchards comprised orchard floor and boundary habitats as well as the fruit tree habitat. The orchard floor in all three orchards was permanent grassland grazed by cattle. Generally, the grasslands were relatively species-poor in terms of vascular plants, having had a history of inorganic nitrogen application for about 20 years, up until 10 years ago. However, fertiliser had not been uniformly applied to the grassland and patches of grassland were found to be more species-rich, especially in Cherry Orchard, being closest in type to the BAP priority habitat of Lowland Meadow. The relaxation of fertiliser use should enable these patches to act as seed sources for colonisation of the more species-poor areas in the coming years. A particularly important feature of the grassland was the presence of assemblages of waxcap fungi. These were notably diverse in Cherry Orchard, where 12 species of *Hygrocybe* were recorded, including the priority BAP species *Hygrocybe calyptriformis*. The historical evidence compiled for the orchards suggests that Cherry Orchard had the oldest grassland, being noted as orchard under grass in 1870, whereas much of the site of Old

Orchard was arable at that time, while the site of Far Orchard was still coppice woodland at that date.

The presence of cattle, the main grazers in the 'wood pasture' system of the orchards, supplied a potential dung habitat for a wide range of species. Analysis of species records across groups shows that at least 97 species (5% of the total) are strongly associated with dung. These include Fungi, Coleoptera, Diptera and a Dermapteron (earwig). The extent to which these species were associated with dung produced by the wild mammal fauna of the area (deer, birds, small mammals) rather than that produced by the grazing cattle is unclear, but during the grazing season the mass of cattle dung available must have vastly exceeded that produced by wild species.

A total of 12 blood-sucking species was recorded (all Diptera). As with the dung species, there must be some uncertainty as to whether the wild mammal or bird species provide the food source or whether the association is with the cattle which regularly graze the orchards.

The high number of orchard trees with well-developed veteran tree features provided an abundance of wood-decay habitats for specialist species which depend upon them (saproxylic species). A total of 224 species (12% of the total) known to be dependent on, or regularly associated with, dead wood were recorded including Fungi, Diptera, Coleoptera, Hymenoptera, and Lepidoptera. The Diptera (126 species) were the largest group due to the presence of many species of fungus gnat (Mycetophilidae) which feed on fungi involved in the process of breaking down dead wood. Far Orchard had the greatest number of saproxylic Diptera (103 species). Among the 50 Coleoptera species associated with wood-decay habitats (22% of the total number of Coleoptera) were 5 Indicators of Ecological Continuity (IEC), ie species thought to be associated with continuity of tree cover in the landscape through time (Alexander 2004). These species at Bowcastle Farm included two species with the strongest association with habitat continuity (graded IEC 1). Far Orchard had the highest numbers of saproxylic Coleoptera, 4 of which are Indicators of Ecological Continuity, while Cherry Orchard and Old Orchard each had one Indicator species.

The abundance of old trees and wood-decay features had attracted a range of hole-nesting birds, including woodpeckers (*Dendrocarpus major*, *Dendrocarpus minor* and *Picus viridus*) and redstart (*Phoenicurus phoenicurus*). Far Orchard had the greatest number of woodpecker holes in the trees and much the highest number of woodpecker records (Appendix C).

The trees had only limited numbers of epiphytic bryophyte and lichen species, and no mistletoe was present. The relative paucity of the epiphytic lower plant flora may be related to the history of air pollution in the area. The orchards lie less than 20 km from the Birmingham conurbation, in an area where deposition of sulphur and nitrogen increases steeply from west to east (NEGTAP 2001).

The hedgerows, which formed the majority of the boundaries of the orchards, had a variety of woody species, qualifying them as priority BAP hedgerows. Woodland herbs such as *Teucrium scorodonia* (wood sage) and *Dryopteris felix-mas* (male fern) were also found in the hedgerows. The scrub habitat provided by the hedgerows was important for breeding birds such as dunnock (*Prunella modularis*), lesser whitethroat (*Sylvia curruca*) and wren (*Troglodytes troglodytes*).

23.3.3 Rare and threatened species

The three orchards provided habitats used by a wide range of rare and threatened species. There were 5 priority BAP species present, with one representative each from the following major taxon groups: fungi, invertebrates, amphibians, birds and mammals. The BAP waxcap fungus *Hygrocybe calyptriformis,* has already been mentioned above. *Gnorimus nobilis*, the noble chafer beetle, was found in Far Orchard. It is a saproxylic species, the larvae of which live in the heartwood of orchard fruit trees. The other 3 BAP species, great crested newt (*Triturus cristatus*), spotted flycatcher (*Muscicapa striata*, also a Red List bird) and pipistrelle bat (*Pipistrellus pipistrellus*), probably use the orchards as part of the mosaic of habitats they exploit; the newt for sheltering and foraging, the spotted flycatcher for feeding and possibly nesting and the pipistrelle bat for foraging activity. Far Orchard had all 5 BAP species, Cherry Orchard had two BAP species and Old Orchard had one BAP species.

Overall, as well as these priority BAP species, the orchards supported 56 nationally rare, nationally scarce or declining species including 2 Red List birds and 8 Amber List birds. The record for nesting lesser spotted woodpecker, *Dendrocarpus minor,* is interesting as it was noted for its association with old orchards in Worcestershire over 50 years ago (Harthan 1947), but it is only recently that the importance of the habitat for the species has begun to be recognised. Work on the species in Germany indicates that orchards there are better quality breeding habitat for the species than deciduous woodland (Höntsch 2005).

Invertebrates predominate in the list of rare and scarce species, in particular saproxylic species. Among the Coleoptera, twelve out of the 15 rare and scarce species are saproxylic (including *Gnorimus nobilis*), 9 out of 14 Diptera are saproxylic, as are 4 out of 12 rare and scarce Hymenoptera, including *Lasius brunneus*, the brown ant. Of the 3 nationally scarce Lepidoptera, the larva of the waved black (*Parascotia fulginaria*) was found feeding on the fungus *Stereum hirsutum* growing on a dead log in Far Orchard. Other habitats within the orchard also supported rare and scarce species, such as 2 nationally scarce Hemiptera, *Amblytus brevicollis* and *Oliaris panzeri*, associated with the grassland, and the fly *Hydrotea meridionalis*, associated with dung. Predators and parasites also feature in the list, like the predatory two coloured mimic wasp, *Psen bicolor*, which feeds on leafhoppers and the wasp *Sapyga clavicornis* which is a parasite of the sleepy carpenter bee, *Chelostoma florisomne*, a saproxylic species.

Far Orchard had the most rare, scarce and declining species (39 species plus 5 BAP species), Cherry Orchard has 22 species plus 3 BAP species. Only 4 such species, including 1 BAP species was recorded in Old Orchard but see the discussion below on the overall comparison of the three orchards to put this finding in context.

23.4 Landscape setting and comparison of the orchards

Far Orchard had the largest species count with a total of 1,375 recorded species compared with the Cherry Orchard with 1,093 species and the Old Orchard with 328 species (Table 8). As described above, Far Orchard also had the highest number or rare, scarce and declining species and Old Orchard had the fewest of these species. However, the fact that no malaise trap was sited in the Old Orchard greatly influenced this final tally and makes direct comparisons between the three orchards impossible. Even though it had more limited veteran tree habitat available, it is not possible to link this with numbers of saproxylic species because most species were caught in the malaise traps.

Both Far Orchard and Cherry Orchard were sampled with malaise traps and interestingly Far Orchard had a slightly higher proportion of saproxylic Coleoptera and Diptera among the totals for these groups compared to Cherry Orchard (saproxylic Coleoptera 24%, saproxylic Diptera 20% in Far Orchard and saproxylic Coleoptera 20% and saproxylic Diptera 16% in Cherry Orchard). Two possible factors behind the differences could be the rather greater abundance of wood-decay habitat available in Far Orchard, judged by the frequency of 'Vitality Scores' (see section 23.2 above) and the fact that there were almost twice as many trees in Far Orchard compared to Cherry Orchard, and / or the location of the orchard adjacent to woodland.

A relationship between abundance of veteran tree features and number of saproxylic invertebrates was found in the six orchards studied in the parallel English Nature project (Lush and others in prep). Perhaps surprisingly, the highest numbers of Indicators of Ecological Continuity (11) occurred in a Gloucestershire orchard some distance from ancient woodland, the nearest stand of which was over 0.5 km away across the River Severn. However, the site was surrounded by extensive traditional orchards. The relevance of the Wyre Forest woodlands to the saproxylic fauna in the Bowcastle Farm Orchards needs to be carefully assessed. The woodland is composed of relatively young stems, with a closed canopy and it had a coppice history, whereas the orchards had a concentration of wood-decay habitat and were relatively well-lit, resembling the conditions in ancient wood pasture habitat. Alexander (2004) notes that closed canopy woodland or woodlands that have been managed as coppice tend to be relatively species-poor in saproxylic invertebrates. Interestingly, the presence of a bracket fungus, *Ganoderma* sp. on a number of cherries in the orchards (see section 9.3) was contrasted with the rarity of such records in the adjacent woodlands, due to their lack of mature trees. It is likely though that some species with less specific requirements may be using both woodland and orchard habitats at Bowcastle Farm, and thus increase the tally for Far Orchard.

23.5 Suggestions for further work

The 'Vitality Score' devised by Brian Stephens shows promise as a means of rapid assessment of orchard condition and it would be valuable to test the method more widely to examine consistency and repeatability among different recorders. The relationship of veteran tree features, captured by the 'Vitality Score' or by some other means, to biodiversity is an important topic deserving further work. More widely, further work to elucidate the ecological relationships among the rich biodiversity demonstrated to occur in orchard habitats would help to underpin effective conservation management.

Although the number of species recorded during the study was remarkably high, certain groups of invertebrates appear to have been under-recorded. Future work focussing on those groups could reasonably be expected to produce records of a significant number of additional species. Evidence for this potential lies in the relative preponderance of Diptera species (659) over Coleoptera species (230) in our survey. It might have been expected that more equal numbers of species of each taxon would have been present.

The present survey was dominated by the success of the malaise trap program. These traps are very efficient at capturing agile flying insects such as Diptera and Hymenoptera which, when disoriented by flying into the central curtain, tend to recover quickly and fly upwards towards the bright sky above where they are captured. More clumsy insects such as beetles

tend to drop towards the ground and escape capture. A trapping program using devices oriented towards capturing species that the malaise traps missed should potentially add a substantial number of species to the list. Such devices would include pitfall traps, water traps, emergence traps and similar devices.

The current study largely ignored the fauna of the soil and ground surface layer. No attempt was made to systematically study this zone. A future study might include investigation of the soil fauna by sifting soil and leaf litter. The use of suction traps would surely produce a significant number of additional species from the around the base of the grass tussocks in the orchards.

Finally, there is the study of those groups sampled during the present study but not actually reported on because of inability to the identify them within the time available for the project. These would include large numbers of minute Parasitic Hymenoptera, Diptera and Microlepidoptera captured in the malaise traps. In future, some modification might be necessary to the final capture method within the traps (dropping into 70% alcohol) to minimise damage to the specimens.

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ENGLISH NATURE

Research Information Note

English Nature Research Reports, No. 707

The biodiversity of three traditional orchards within the Wyre Forest SSSI in Worcestershire: a survey by the Wyre Forest Study Group

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Keywords: traditional orchards, biodiversity, rare species, Wyre Forest, saproxylic

Introduction

Traditional orchards and their associated habitats support a wide variety of wildlife. However there have been very few systematic studies of the biodiversity of such orchards. To help fill this gap, English Nature set up a project in 2004 to review the extent, distribution, biodiversity and management of traditional orchards in England, and included in the project some selective orchard surveys. In parallel with this project, and with support from English Nature, the Wyre Forest Study Group undertook a separate survey of the fauna and flora of three traditional orchards forming part of Bowcastle Farm, which is situated on the edge of the Wyre Forest in the county of Worcestershire. The Wyre Forest Study Group is a local natural history and conservation group with broad technical expertise across a wide range of taxonomic groups. The Bowcastle Farm orchards cover an area of 5.39 hectares and lie within the Wyre Forest Site of Special Scientific Interest.

What was done

The aim of the survey was to demonstrate the range of biodiversity that orchards managed in a sympathetic manner can support. While the English Nature study concentrated on habitat recording, and selective recording of lichens, bryophytes, fungi and invertebrates, the members of the Wyre Forest Study Group carried out species recording in greater depth and over a much wider range of taxa. Their comprehensive survey of three traditional orchards is the first of its kind in the UK and is thus of unique importance in understanding the biodiversity of this habitat.

Results and conclusions

The grand total of 1,868 species of wild plants and animals was recorded from the orchards, including vascular plants, bryophytes, fungi, lichens, vertebrates, and invertebrates. The habitats available to this great variety of species comprised orchard floor and boundary habitats as well as the fruit tree habitats. The orchard floor in all three orchards was permanent grassland grazed by cattle. Generally, the grasslands were relatively species-poor in terms of vascular plants, but patches of grassland were found to be more species-rich, being closest in type to the BAP priority habitat of Lowland Meadow. A particularly important feature of the grassland was the presence of assemblages of waxcap fungi, including the priority BAP species *Hygrocybe calyptriformis*. The presence of cattle, the main grazers in the 'wood pasture' system of the orchards, supplied a potential dung habitat for 97 species (5% of the total). The hedgerows which formed the majority of the boundaries of the orchards had a variety of woody species, qualifying them as priority BAP hedgerows.

Continued……

A novel way of recording condition of the trees was developed by Brian Stephens during the survey and the results showed that most trees were in the later stages of life and had abundant veteran tree features such as hollow trunks or fissured bark, providing an abundance of wood-decay habitats for specialist species which depend upon them (saproxylic species). A total of 224 species (12% of the total) known to be dependent on, or regularly associated with, dead wood were recorded. The Diptera (126 species) were the largest group due to the presence of many species of fungus gnat (Mycetophilidae) which feed on fungi involved in the process of breaking down the dead wood. Among the 50 Coleoptera species associated with wood-decay habitats (22% of the total number of Coleoptera) were 5 Indicators of Ecological Continuity, ie species thought to be associated with continuity of tree cover in the landscape through time. The abundance of old trees and wood-decay features had attracted a range of hole-nesting birds, including woodpeckers (*Dendrocarpus major*, *Dendrocarpus minor* and *Picus viridus*) and redstart (*Phoenicurus phoenicurus*). The trees had only limited numbers of epiphytic bryophyte and lichen species, and no mistletoe was present. The relative paucity of the epiphytic lower plant flora may be related to the history of air pollution in the area.

The three orchards provided habitats used by a wide range of rare and threatened species. There were 5 priority BAP species present including the waxcap fungus *Hygrocybe calyptriformis*. *Gnorimus nobilis*, the noble chafer beetle, was found in Far Orchard. It is a saproxylic species, the larvae of which live in the heartwood of orchard fruit trees. The other 3 BAP species, great crested newt (*Triturus cristatus*), spotted flycatcher (*Muscicapa striata*, also a Red List bird) and pipistrelle bat (*Pipistrellus pipistrellus*), probably use the orchards as part of the mosaic of habitats they exploit.

The orchards also supported 56 nationally rare, nationally scarce or declining species including 2 Red List birds and 8 Amber List birds. The record for nesting lesser spotted woodpecker, *Dendrocarpus minor,* is interesting recent research on the species in Germany indicates that orchards there are better quality breeding habitat for the species than deciduous woodland. There was a predominance of saproxylic invertebrates among the rare species including 12 out of 15 Coleoptera, 9 out of 14 Diptera and 4 out of 12 rare and scarce Hymenoptera, including *Lasius brunneus*, the brown ant. Of the 3 nationally scarce Lepidoptera, the larva of the waved black (*Parascotia fulginaria*) was found feeding on the fungus *Stereum hirsutum* growing on a dead log in Far Orchard. Other habitats within the orchard also supported rare and scarce species, such as 2 nationally scarce Hemiptera, *Amblytus brevicollis* and *Oliaris panzeri*, associated with the grassland, and the fly *Hydrotea meridionalis*, associated with dung. Predators and parasites also feature in the list like the predatory two coloured mimic wasp, *Psen bicolour*, which feeds on leafhoppers and the wasp *Sapyga clavicornis* which is a parasite of the sleepy carpenter bee, *Chelostoma florisomne*, a saproxylic species.

Although the number of species recorded during the study was remarkably high, certain groups of invertebrates appear to have been under-recorded. Additional species could be added to the fauna in future by using different sampling methods and by identifying taxonomically difficult species that could not be identified within the current project.

English Nature's viewpoint

This biodiversity survey of three traditional orchards on the fringe of the Wyre Forest is the first orchard study in the UK to be carried out in such a comprehensive way. It is an important addition to our knowledge of orchard biodiversity, which has received relatively little attention in the past. The survey will also contribute to a better understanding of the conservation needs of the habitat. We hope that other naturalists will be inspired by the Wyre Forest Study Group's great achievement and follow their successful model, both to find out more about the wildlife of their local area and to add to ecological knowledge at national level.

Further information

English Nature Research Reports and their *Research Information Notes* are available to download from our website: www.english-nature.org.uk

For a printed copy of the full report, or for information on other publications on this subject, please contact the Enquiry Service on 01733 455100/101/102 or e-mail enquiries@english-nature.org.uk

Appendices

Appendix A Species records summarised by high taxon

Notes on columns:

CHE : Cherry Orchard
OLD: Old Orchard
FAR: Far Orchard

RECORDS BY METHOD AND SPECIES BY METHOD: see sections 2.1 and 2.2 for summary of methods and individual high taxon accounts for details

SPECIES BY HABITAT: Community associations / assemblages, see section 2.8 for details

JNCC STATUS INFORMATION: Conservation status, see sections 2.9 and 2.10 for details. Col F are listings based on IUCN criteria, Col G are listings based on national Red-listed and rare species

SPECIMEN COUNT: Unsp. is 'unspecified', referring to the sex of the specimen

APPENDIX A - Species records summarised by high taxon

	RECORDS BY ORCHARD				SPECIES BY ORCHARD				RECORDS BY METHOD			SPECIES BY METHOD			SPECIES BY HABITAT				JNCC STATUS INFO			SPECIMEN COUNT			
	CHE	OLD	FAR	ALL	CHE	OLD	FAR	ALL	Malaise	Light	Manual	Malaise	Light	Manual	Saprox.	Dung	Blood	Hedge	Col.F	Col.G	BAP	Male	Female	Unsp.	ALL
Vascular Plants	71	54	90	215	71	54	90	111	0	0	215	0	0	111	0	0	0	28	0	0	0	0	0	215	215
Bryophyta	27	5	23	55	27	5	23	38	0	0	55	0	0	38	0	0	0	0	0	0	0	0	0	55	55
Fungi	25	7	34	66	25	7	25	43	0	0	66	0	0	43	12	5	0	0	0	0	1	0	0	66	66
Lichens	12	29	29	70	12	21	20	27	0	0	70	0	0	27	0	0	0	0	0	0	0	0	0	70	70
Amphibia	0	0	2	2	0	0	2	2	0	0	2	0	0	2	0	0	0	0	1	0	1	0	0	2	2
Aves	25	16	54	95	16	11	24	33	0	0	95	0	0	33	0	0	0	0	0	11	1	0	0	113	113
Mammalia	9	3	17	29	6	2	12	13	0	0	29	0	0	13	0	0	0	0	0	0	1	0	0	31	31
Coleoptera	349	37	346	732	153	37	145	230	586	0	146	181	0	94	50	13	0	0	2	13	1	5	12	845	862
Diptera	1290	22	1591	2903	429	17	512	659	2793	15	95	642	8	70	126	78	12	0	3	19	0	3936	3646	957	8539
Hemiptera	161	6	194	361	57	5	69	92	330	0	31	83	0	22	0	0	0	0	0	2	0	131	238	315	684
Hymenoptera	255	4	330	589	125	4	156	220	538	0	51	200	0	42	25	0	0	0	3	9	0	61	313	718	1092
Lepidoptera	185	239	538	962	119	160	245	321	179	690	93	61	277	61	7	0	0	0	0	3	0	5	11	4480	4496
Collembola	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Dermaptera	28	1	7	36	1	1	1	1	33	0	3	1	0	1	0	1	0	0	0	0	0	25	24	24	73
Neuroptera	10	0	14	24	3	0	5	5	23	0	1	5	0	0	0	0	0	0	0	0	0	4	7	22	33
Odonata	1	1	2	4	1	1	2	3	1	0	3	1	0	3	0	0	0	0	0	0	0	0	1	3	4
Orthoptera	1	0	2	3	1	0	1	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	3
Plecoptera	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Psocoptera	29	0	17	46	5	0	4	6	46	0	0	6	0	0	0	0	0	0	0	0	0	75	24	56	155
Siphonaptera	1	0	0	1	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	2	3
Strepsiptera	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1
Trichoptera	1	0	3	4	1	0	3	3	4	0	0	3	0	0	0	0	0	0	0	0	0	3	1	0	4
Arachnida	66	3	48	117	30	3	20	38	107	0	10	35	0	9	1	0	0	0	0	0	0	183	161	29	373
Chilopoda	1	0	2	3	1	0	2	3	1	0	2	1	0	2	1	0	0	0	0	0	0	0	0	3	3
Diplopoda	0	0	3	3	0	0	3	3	0	0	3	0	0	3	2	0	0	0	0	0	0	0	0	3	3
Isopoda	12	0	7	19	3	0	3	3	8	0	11	2	0	3	0	0	0	0	0	0	0	0	0	19	19
Mollusca	7	0	4	11	6	0	4	9	0	0	11	0	0	9	0	0	0	0	0	0	0	0	0	11	11
TOTALS	**2566**	**427**	**3360**	**6353**	**1093**	**328**	**1374**	**1868**	**4655**	**705**	**993**	**1225**	**285**	**587**	**224**	**97**	**12**	**28**	**9**	**57**	**5**	**4429**	**4439**	**8044**	**16912**

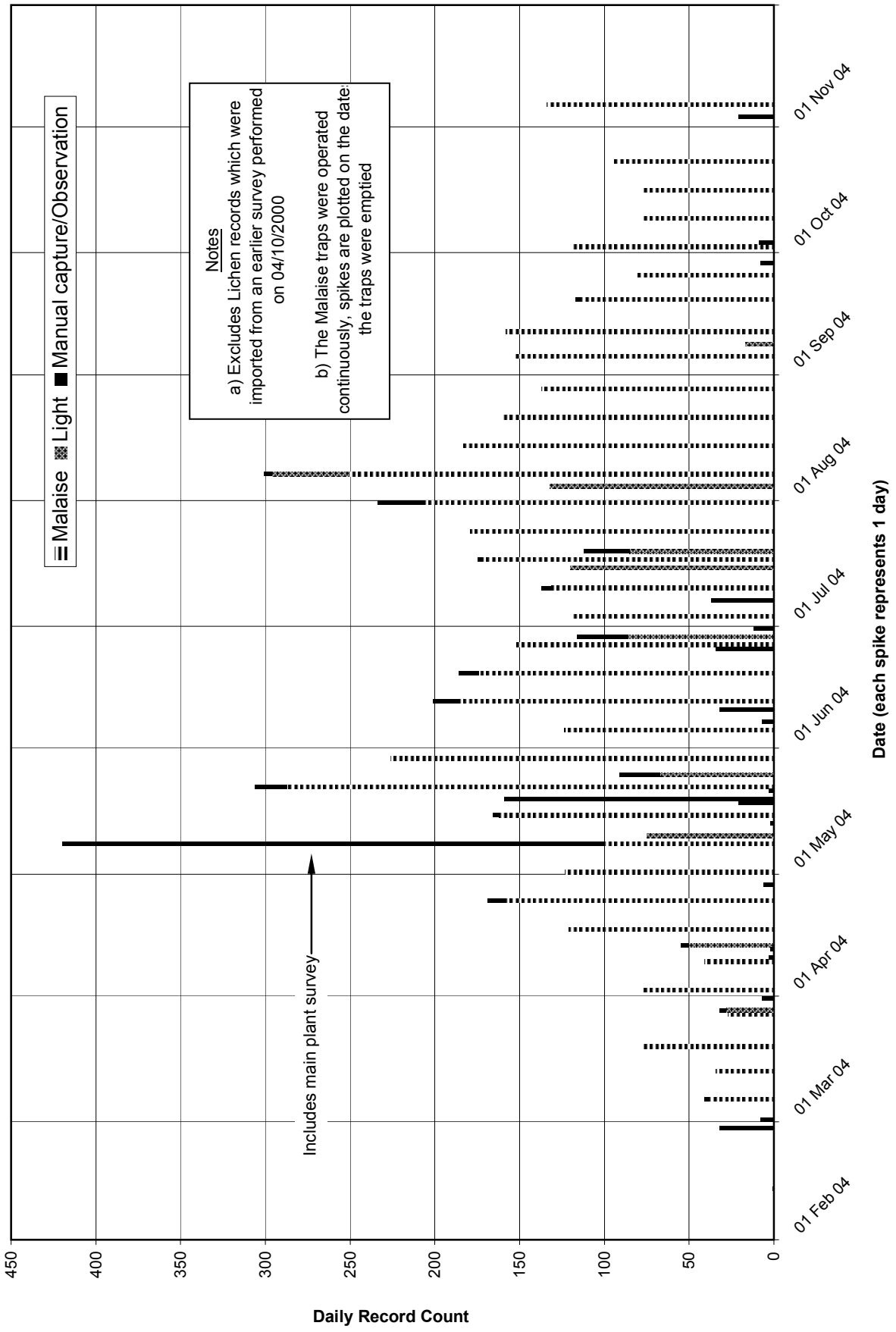
APPENDIX B1 - List of contributors and their taxonomic interests

STATUS	NAME / ABBR	AMPHIBIA	ARACHNIDA	AVES	BRYOPHYTA	CHILOPODA	COLEOPTERA	COLLEMBOLA	DERMAPTERA	DIPLOPODA	DIPTERA	FUNGI	HEMIPTERA	HYMENOPTERA	ISOPODA	LEPIDOPTERA	LICHENS	MAMMALIA	MOLLUSCA	NEUROPTERA	ODONATA	ORTHOPTERA	PLECOPTERA	PSOCOPTERA	SIPHONAPTERA	STREPSIPTERA	TRICHOPTERA	VASC. PLANTS	FRUIT TREES
WYRE FOREST STUDY GROUP (WFSG) MEMBERS	M. Averill																	B											
	D.Barnett		B				B				B			B		B				B									
	J. Bingham			B								B		B		B		B			B							B	
	M.G. Bloxham										D																		
	M.E. Blythe		R			R	R	R	R		B		B	R	R	R				B	R	R		B	B	R	R		
	G.H. Green		R								B			R															
	P.& F. Lancaster			B												B													
	K.A. McGee	B		B			B						B	B		B		B			B								
	J.W. Meiklejohn		B			B	B			B			B	B	B	B			B	B	B	D	B	B					
	M & R Needham									B						B													
	J. Ricketts																B												
	A.N. Simpson															D													
	M.J. Smart										B			R															
	B.M. Stephens																												B
	G.H. Trevis		R											B															
	R.A. Winnall		R	B			B				D	B		B	R	B		B	B		D								
	P. Wright																	B											
	P.G. Clement			B												B													
	D.A. Grundy															B													
	M. Lawley				B																								
	W.J. Partridge		D																										
	A.J. Prior															B													
	C.P. Round															B													
	B. Sage						B																						
	A. Uren															B													
NATIONAL EXPERTS	M.E. Archer													D															
	G.A. Broad													D															
	P.J. Chandler										D																		
	J.H. Cole										D																		
	G.T. Knight													D															
	M.R. Shaw													D															
	P.F. Whitehead						D																						
CONTRACTOR	P.R. Skidmore		D				D	D	D		D		D	D	D	D				D				D		D	D		

R = Collected specimens, D = Identified specimens, B = Both identified and recorded/collected

The 2 or 3 character abbreviation (ABBR) assigned to each individual and used to identify them in the database is also included in this table

APPENDIX B2 - recording as a function season and trapping method



Appendix C: List of all recorded species by high taxon group and family in the Bowcastle Farm Orchards

Notes on columns:

STATUS: Conservation status, see sections 2.9 and 2.10 for details of JNCC and bird status listings. BAP is UK Biodiversity Action Plan.

HABITAT: Community associations / assemblages, see section 2.8 for details

ORCHARD: CHE : Cherry Orchard; OLD: Old Orchard; FAR: Far Orchard

TRAP/SAMPLE: see sections 2.1 and 2.2 for summary of survey methods and individual high taxon accounts for details. SAMPLE refers to the number of records made during the survey period. A record is a unique surveyor/date/place data point.

DAY / MON; FIRST / LAST: Earliest and latest dates (day/month) on which the species was recorded during the survey. These are not particularly meaningful for taxonomic groups surveyed in only one or two visits, but give some idea of the period of activity at Bowcastle Farm for taxa with seasonal habits (e.g. insects and birds).

Contents of Appendix C:

APPENDIX C - List of recorded species

Vascular Plants Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Apiaceae														
Angelica sylvestris	Wild Angelica							1	1			2	08/05	08/05
Anthriscus sylvestris	Cow Parsley						1	1	1			3	08/05	08/05
Conopodium majus	Pignut						1		1			2	08/05	08/05
Heracleum sphondylium	Hogweed						1					1	08/05	08/05
Aquifoliaceae														
Ilex aquifolium	Holly						1	1	1			3	08/05	08/05
Araliaceae														
Hedera helix	Ivy								1			1	08/05	08/05
Asteraceae														
Achillea millefolium	Yarrow						1	1	1			3	08/05	08/05
Bellis perennis	Daisy						1	1	1			3	08/05	08/05
Centaurea nigra	Common Knapweed						1					1	08/05	08/05
Cirsium arvense	Creeping Thistle						1	1	1			3	08/05	08/05
Cirsium palustre	Marsh Thistle						1	1	1			3	08/05	08/05
Cirsium vulgare	Spear Thistle						1	1				2	08/05	08/05
Crepis capillaris	Smooth Hawk's-beard						1		1			2	08/05	08/05
Hypochaeris radicata	Cat's-ear						1	1	1			3	08/05	08/05
Leontodon hispidus	Rough Hawkbit						1					1	08/05	08/05
Leucanthemum vulgare	Ox-eye Daisy						1					1	22/05	22/05
Pilosella officinarum	Mouse-ear Hawkweed								1			1	08/05	08/05
Senecio jacobaea	Ragwort						1		1			2	08/05	08/05
Sonchus asper	Prickly Sow-thistle						1					1	22/05	22/05
Taraxacum officinale agg.	Dandelion						1	1	1			3	08/05	08/05
Betulaceae														
Alnus glutinosa	Alder						1					1	08/05	08/05
Betula pendula	Silver Birch						1		1			2	08/05	08/05
Corylus avellana	Hazel						1	1	1			3	08/05	08/05
Brassicaceae														
Cardamine flexuosa	Wood Bitter-cress								1			1	08/05	08/05
Cardamine pratensis	Lady's Smock								1			1	08/05	08/05
Caprifoliaceae														
Lonicera periclymenum	Honeysuckle								1			1	08/05	08/05
Sambucus nigra	Elder							1	1			2	08/05	08/05
Capryophyllaceae														
Lychnis flos-cuculi	Ragged Robin							1				1	08/05	08/05
Caryophyllaceae														
Cerastium fontanum	Common Mouse-ear						1	1	1			3	08/05	08/05
Cerastium glomeratum	Sticky Mouse-ear						1		1			2	08/05	08/05
Sagina procumbens	Procumbent Pearlwort								1			1	22/05	22/05
Stellaria graminea	Lesser Stitchwort								1			1	22/05	22/05
Stellaria media	Common Chickweed						1		1			2	08/05	08/05
Clusiaceae														
Hypericum humifusum	Trailing St John's Wort								1			1	22/05	22/05
Cyperaceae														
Carex flacca	Sedge						1					1	22/05	22/05
Dryopteridaceae														
Dryopteris filix-mas	Common Male Fern								1			1	08/05	08/05
Euphorbiaceae														
Euphorbia amygdaloides	Wood Spurge								1			1	08/05	08/05
Fabaceae														
Cytisus scoparius	Broom								1			1	08/05	08/05
Lotus corniculatus	Common Bird'sfoot-trefoil						1		1			2	08/05	08/05
Lotus pedunculatus	Greater Bird'sfoot-trefoil							1				1	08/05	08/05
Trifolium dubium	Lesser Trefoil								1			1	08/05	08/05
Trifolium pratense	Red Clover						1	1	1			3	08/05	08/05

APPENDIX C - List of recorded species

Vascular Plants Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Trifolium repens	White Clover						1	1	1			3	08/05	08/05
Ulex gallii	Western Gorse								1			1	08/05	08/05
Vicia cracca	Tufted Vetch								1			1	08/05	08/05
Vicia sativa ssp.nigra	Common Vetch							1	1			2	22/05	22/05
Vicia sepium	Bush Vetch						1	1	1			3	08/05	08/05
Fagaceae														
Quercus sp.	Sessile Oak Hybrid						1	1	1			3	08/05	08/05
Geraniaceae														
Geranium molle	Dove's-foot Crane's-bill							1				1	22/05	22/05
Geranium robertianum	Herb Robert						1		1			2	08/05	08/05
Juncaceae														
Juncus effusus	Soft Rush						1					1	22/05	22/05
Luzula campestris	Field Woodrush						1	1	1			3	08/05	08/05
Lamiaceae														
Ajuga reptans	Bugle						1	1	1			3	08/05	08/05
Glechoma hederacea	Ground Ivy						1	1				2	08/05	08/05
Lamium purpureum	Red Dead-nettle						1					1	08/05	08/05
Stachys sylvatica	Hedge Woundwort						1		1			2	08/05	08/05
Teucrium scorodonia	Wood Sage								1			1	08/05	08/05
Liliaceae														
Hyacinthoides non-scripta	Bluebell								1			1	08/05	08/05
Oleaceae														
Fraxinus excelsior	Ash						1	1	1			3	08/05	08/05
Onagraceae														
Chamerion angustifolium	Rose-bay Willow-herb								1			1	08/05	08/05
Plantaginaceae														
Plantago lanceolata	Ribwort Plantain						1	1	1			3	08/05	08/05
Plantago major	Greater Plantain						1	1				2	08/05	08/05
Poaceae														
Agrostis capillaris	Common Bent-grass						1	1	1			3	08/05	08/05
Alopecurus pratensis	Meadow Fox-tail						1	1	1			3	08/05	08/05
Anthoxanthum odoratum	Sweet Vernal-grass						1	1	1			3	08/05	08/05
Bromus hordeaceus	Brome						1					1	22/05	22/05
Cynosurus cristatus	Crested Dog's-tail						1	1	1			3	08/05	08/05
Dactylis glomerata	Cock's-foot						1	1	1			3	08/05	08/05
Deschampsia caespitosa	Tufted Hair-grass							1				1	08/05	08/05
Festuca rubra	Red Fescue						1	1	1			3	08/05	08/05
Holcus lanatus	Yorkshire Fog						1	1	1			3	08/05	08/05
Holcus mollis	Creeping Soft-grass								1			1	08/05	08/05
Lolium perenne	Perennial Rye-grass						1	1	1			3	08/05	08/05
Phleum bertolonii	Cat's-tail								1			1	08/05	08/05
Phleum pratense	Timothy						1	1	1			3	08/05	08/05
Poa annua	Annual Poa						1	1	1			3	08/05	08/05
Poa pratensis	Smooth Meadow-grass						1	1	1			3	22/05	22/05
Poa trivialis	Rough Meadow-grass						1	1	1			3	08/05	08/05
Polygonaceae														
Rumex acetosa	Common Sorrel						1		1			2	08/05	08/05
Rumex acetosella	Sheep's Sorrel						1		1			2	08/05	08/05
Rumex obtusifolius	Broad-leaved Dock						1		1			2	08/05	08/05
Rumex sanguineus	Red-veined Dock								1			1	08/05	08/05
Primulaceae														
Primula veris	Cowslip						1					1	08/05	08/05
Prunella vulgaris	Selfheal						1	1	1			3	08/05	08/05

APPENDIX C - List of recorded species

Vascular Plants Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Ranunculaceae														
Ranunculus acris	Meadow Buttercup						1	1	1			3	08/05	08/05
Ranunculus bulbosus	Bulbous Buttercup						1	1	1			3	08/05	08/05
Ranunculus repens	Creeping Buttercup						1	1	1			3	08/05	08/05
Rosaceae														
Aphanes arvensis	Parsley Piert								1			1	22/05	22/05
Crataegus monogyna	Hawthorn						1	1	1			3	08/05	08/05
Fragaria vesca	Wild Strawberry								1			1	08/05	08/05
Geum urbanum	Herb Bennet								1			1	08/05	08/05
Potentilla anserina	Silverweed							1				1	08/05	08/05
Potentilla erecta	Tormentil								1			1	08/05	08/05
Potentilla sterilis	Barren Strawberry								1			1	08/05	08/05
Prunus avium	Wild Cherry							1	1			2	08/05	08/05
Prunus domestica	Wild Plum						1	1	1			3	08/05	08/05
Prunus spinosa	Blackthorn						1	1	1			3	08/05	08/05
Rosa arvensis	Field Rose						1		1			2	08/05	08/05
Rosa canina agg.	Dog Rose						1					1	22/05	22/05
Rubus fruticosus agg.	Blackberry						1		1			2	08/05	08/05
Rubiaceae														
Galium aparine	Cleavers						1	1	1			3	08/05	08/05
Galium saxatile	Heath Bedstraw								1			1	08/05	08/05
Salicaceae														
Salix aurita	Eared Willow								1			1	22/05	22/05
Salix caprea	Goat Willow						1		1			2	08/05	08/05
Scrophulariaceae														
Linaria vulgaris	Yellow Toadflax								1			1	08/05	08/05
Veronica chamaedrys	Gemander Speedwell						1		1			2	08/05	08/05
Veronica officinalis	Heath Speedwell							1	1			2	08/05	08/05
Veronica serpyllifolia	Thyme-leaved Speedwell						1	1	1			3	08/05	08/05
Taxaceae														
Taxus baccata	Yew							1				1	08/05	08/05
Urticaceae														
Urtica dioica	Stinging Nettle						1	1	1			3	08/05	08/05
Violaceae														
Viola riviniana	Common Dog Violet								1			1	08/05	08/05
Total Vascular Plants species recorded	**111**						**71**	**54**	**90**			**111**		
Total records	**215**						**71**	**54**	**90**			**215**		

Bryophyta (Mosses & Liverworts) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Amblystegiaceae														
Amblystegium serpens	a moss						1	1	1			3	08/05	08/05
Calliergonella cuspidata	a moss						1		1			2	08/05	08/05
Brachytheciaceae														
Brachythecium albicans	a moss								1			1	08/05	08/05
Brachythecium rutabulum	a moss						1		1			2	08/05	08/05
Brachythecium velutinum	Velvet Feather-moss						1					1	08/05	08/05
Homalothecium sericeum	Silky Wall Feather-moss						1					1	08/05	08/05
Kindbergia praelonga	a moss						1		1			2	08/05	08/05
Oxyrrhynchium hians	Swartz's Feather-moss						1					1	08/05	08/05
Rhynchostegium murale	a moss						1					1	08/05	08/05
Bryaceae														
Bryum capillare	a moss						1		1			2	08/05	08/05
Bryum radiculosum	Wall Thread-moss						1					1	08/05	08/05
Bryum rubens	a moss						1		1			2	08/05	08/05
Bryum ruderale	a moss								1			1	08/05	08/05
Dicranaceae														
Ceratodon purpureus	a moss						1		1			2	08/05	08/05
Dicranella heteromalla	Silky Forklet-moss						1					1	08/05	08/05
Dicranum scoparium	a moss								1			1	08/05	08/05
Ditrichaceae														
Ditrichum heteromallum	a moss								1			1	08/05	08/05
Fissidentaceae														
Fissidens bryoides	Lesser Pocket-moss						1					1	08/05	08/05
Fissidens taxifolius	Common Pocket-moss						1					1	08/05	08/05
Geocalycaceae														
Lophocolea bidentata	Bifid Crestwort						1					1	08/05	08/05
Lophocolea heterophylla	Variable-leaved Crestwort						1					1	08/05	08/05
Grimmiaceae														
Grimmia pulvinata	a moss						1	1	1			3	08/05	08/05
Schistidium crassipilum	a moss								1			1	08/05	08/05
Hylocomiaceae														
Rhytidiadelphus squarrosus	a moss						1	1	1			3	08/05	08/05
Hypnaceae														
Hypnum cupressiforme	a moss						1		1			2	08/05	08/05
Mniaceae														
Plagiomnium undulatum	a moss						1		1			2	08/05	08/05
Orthotrichaceae														
Orthotrichum affine	a moss								1			1	08/05	08/05
Orthotrichum anomalum	a moss						1		1			2	08/05	08/05
Orthotrichum diaphanum	a moss								1			1	08/05	08/05
Plagiotheciaceae														
Plagiothecium curvifolium	Curved Silk-moss						1					1	08/05	08/05
Polytrichaceae														
Atrichum undulatum	Common Smoothcap						1					1	08/05	08/05
Pottiaceae														
Barbula convoluta	a moss								1			1	08/05	08/05
Barbula unguiculata	a moss								1			1	08/05	08/05
Didymodon insulanus	a moss							1				1	08/05	08/05
Didymodon vinealis	a moss						1					1	08/05	08/05
Syntrichia intermedia	a moss							1				1	08/05	08/05
Tortula muralis var. muralis	a moss						1		1			2	08/05	08/05
Rhabdoweisiaceae														

Dicranoweisia cirrata	a moss	1		1	2	08/05	08/05
Total Bryophyta species recorded	**38**	**27**	**5**	**23**	**38**		
Total records	**55**	**27**	**5**	**23**	**55**		

APPENDIX C - List of recorded species

Fungi Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Agaricaceae														
Agaricus campestris	Field Mushroom						1					1	28/09	28/09
Bolbitiaceae														
Agrocybe praecox	an agaric								1			1	08/05	08/05
Bolbitius titubans	an agaric				X		1					1	28/09	28/09
Clavariaceae														
Clavulinopsis corniculatus	a fungus							1				1	03/11	03/11
Coprinaceae														
Panaeolus fimicola	an agaric				X				1			1	28/09	28/09
Panaeolus papilionaceus	Bell-shaped Mottle-gill				X				1			1	08/05	08/05
Panaeolus semiovatus	an agaric				X		1		1			2	08/05	08/05
Entolomataceae														
Entoloma conferendum	a fungus								1			1	08/05	08/05
Entoloma corvinum	a fungus								1			1	28/09	28/09
Ganodermataceae														
Ganoderma sp.	a fungus			X			1		3			4	28/04	12/06
Humariaceae														
Cheilymeria sterecorea	a fungus				X		1					1	08/05	08/05
Hygrophoraceae														
Hygrocybe aurantiosplender	a basidiomycete fungus						1					1	08/05	08/05
Hygrocybe calyptriformis	a basidiomycete fungus		Y				1		1			2	03/10	03/11
Hygrocybe ceracea	a basidiomycete fungus						1	1				2	03/11	03/11
Hygrocybe chlorophana	a basidiomycete fungus						1	1	3			5	19/09	03/11
Hygrocybe coccinea	Scarlet Hood						1					1	03/11	03/11
Hygrocybe flavipes	a basidiomycete fungus								1			1	03/10	03/10
Hygrocybe irrigata	a basidiomycete fungus						1					1	03/11	03/11
Hygrocybe nitrata	a basidiomycete fungus								1			1	03/10	03/10
Hygrocybe pratensis var. pratensis	a basidiomycete fungus						1		1			2	03/10	03/11
Hygrocybe psittacina var. perplexa	a basidiomycete fungus						1					1	03/11	03/11
Hygrocybe psittacina var. psittacina	a basidiomycete fungus						1	1				2	03/11	03/11
Hygrocybe punicea	Crimson Wax-cap						1					1	03/11	03/11
Hygrocybe reidii	a basidiomycete fungus						1					1	03/11	03/11
Hygrocybe virginea var. virginea	a basidiomycete fungus						1	1				2	03/11	03/11
Hymenochaetaceae														
Inonotus hispidus	a basidiomycete fungus			X			1	1	4			6	12/06	03/11
Phellinus pomaceus	a fungus			X					1			1	28/04	28/04
Lycoperdaceae														
Bovista plumbea	Lead-grey Bovist							1				1	21/05	21/05
Polyporaceae														
Abortiporus biennis	a basidiomycete fungus			X					1			1	19/09	19/09
Daedaleopsis confragosa	a basidiomycete fungus			X			1		2			3	12/04	03/11
Laetiporus sulphureus	Sulphur Polypore			X			1					1	03/11	03/11
Polyporus brumalis	a basidiomycete fungus			X					1			1	08/05	08/05
Trametes versicolor	a basidiomycete fungus			X					1			1	08/05	08/05
Stereaceae														
Stereum hirsutum	a basidiomycete fungus			X			1		1			2	15/05	03/11
Strophariaceae														
Hypholoma fasiculare	a fungus						1		2			3	28/04	08/05
Hypholoma lateritium	Brick Caps			X			1					1	08/05	08/05
Stropharia aeruginosa	Verdigris Agaric								1			1	28/09	28/09
Taphrinaceae														
Taphrina prunii	a fungus						1					1	21/05	21/05

APPENDIX C - List of recorded species

Fungi Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Tricholomataceae														
Armillaria mellea	Honey Fungus			X			1					1	03/11	03/11
Collybia dryophila	Russet Shank								1			1	28/09	28/09
Marasmius oreades	Fairy Ring Champignon								1			1	08/05	08/05
Mycena galericulata	Bonnet Mycena			X					1			1	08/05	08/05
Mycena pura	a basidiomycete fungus								1			1	28/09	28/09
Total Fungi species recorded	**43**			**12**	**5**		**25**	**7**	**25**			**43**		
Total records	**66**						**25**	**7**	**34**			**66**		

Lichens Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Candelariaceae														
Candelariella reflexa	a lichen							2	2			4	04/10	04/10
Cladoniaceae														
Cladonia chlorophaea	a lichen							1	1			2	04/10	04/10
Cladonia coniocraea	a lichen								2			2	04/10	04/10
Coniocybaceae														
Chaenotheca ferruginea	a lichen							1				1	04/10	04/10
Lecanoraceae														
Lecanora chlarotera	a lichen						1	1	1			3	04/10	04/10
Lecanora conizaeoides	a lichen						1	1	1			3	04/10	04/10
Lecanora expallens	a lichen							2	2			4	04/10	04/10
Scoliciosporum chlorococcum	a lichen							1				1	04/10	04/10
Lecideaceae														
Hypocenomyce scalaris	a lichen							1				1	04/10	04/10
Micareaceae														
Micarea denigrata	a lichen								1			1	04/10	04/10
Parmeliaceae														
Evernia prunastri	a lichen							1	1			2	04/10	04/10
Hypogymnia physodes	a lichen						1	1	3			5	04/10	04/10
Parmelia caperata	a lichen						1		1			2	04/10	04/10
Parmelia glabratula glabratula	a lichen							1				1	04/10	04/10
Parmelia revoluta	a lichen						1					1	04/10	04/10
Parmelia saxatilis	a lichen						1	2	2			5	04/10	04/10
Parmelia subaurifera	a lichen						1	1	1			3	04/10	04/10
Parmelia sulcata	a lichen						1	2	2			5	04/10	04/10
Usnea cornuta	a lichen								1			1	04/10	04/10
Pertusariaceae														
Pertusaria amara	a lichen							1	1			2	04/10	04/10
Physciaceae														
Buellia punctata	a lichen						1	2				3	04/10	04/10
Physcia tenella	a lichen						1	2	2			5	04/10	04/10
Physconia grisea	a lichen							1				1	04/10	04/10
Teloschistaceae														
Xanthoria parietina	a lichen							2	1			3	04/10	04/10
Xanthoria polycarpa	a lichen						1	1	1			3	04/10	04/10
(Lepraria)														
Lepraria incana	a lichen						1	2	2			5	04/10	04/10
Lepraria revoluta	a lichen								1			1	04/10	04/10
Total Lichens species recorded	**27**						**12**	**21**	**20**			**27**		
Total records	**70**						**12**	**29**	**29**			**70**		

APPENDIX C - List of recorded species

Amphibia (Amphibians) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Salamandridae														
Triturus cristatus	Great-crested Newt	LR(cd)	Y						1			1	07/06	07/06
Triturus helveticus	Palmate Newt								1			1	31/07	31/07
Total Amphibia species recorded		**2**							**2**			**2**		
Total records		**2**							**2**			**2**		

Aves (Birds) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Aegithalidae														
Aegithalos caudatus	Long-tailed Tit								1			1	18/05	18/05
Columbidae														
Columba palumbus	Woodpigeon						3		2			5	18/05	28/06
Corvidae														
Corvus corone corone	Carrion Crow						1		1			2	18/05	10/06
Corvus monedula	Jackdaw						4					4	10/04	28/06
Garrulus glandarius	Jay								1			1	07/07	07/07
Pica pica	Magpie						1	1	1			3	10/06	25/06
Cuculidae														
Cuculus canorus	Cuckoo	*Amber							1			1	08/05	08/05
Fringillidae														
Carduelis carduelis	Goldfinch							2	3			5	18/05	25/06
Carduelis chloris	Greenfinch							3	1			4	18/05	25/06
Fringilla coelebs	Chaffinch								3			3	28/04	10/06
Hirundinidae														
Hirundo rustica	Swallow	*Amber						2	4			6	08/05	31/07
Muscicapidae														
Muscicapa striata	Spotted Flycatcher	*Red	Y						3			3	25/05	31/07
Paridae														
Parus caeruleus	Blue Tit						1	2	2			5	10/04	10/06
Parus major	Great Tit							1	1			2	18/05	18/05
Phasianidae														
Alectoris rufa	Red-legged Partridge							1				1	10/06	10/06
Phasianus colchicus	Pheasant						1					1	10/06	10/06
Picidae														
Dendrocopos major	Great Spotted Woodpecker						1	1	9			11	28/04	31/07
Dendrocopos minor	Lesser Spotted Woodpecker	*Red							3			3	28/04	10/06
Picus viridis	Green Woodpecker	*Amber						1	4			5	13/04	31/07
Prunellidae														
Prunella modularis	Dunnock	*Amber					1					1	10/06	10/06
Sittidae														
Sitta europaea	Nuthatch								2			2	08/05	10/06
Strigidae														
Athene noctua	Little Owl						4					4	28/02	28/06
Sturnidae														
Sturnus vulgaris	Starling	*Red					1					1	10/06	10/06
Sylviidae														
Phylloscopus collybita	Chiffchaff						1					1	10/06	10/06
Phylloscopus trochilus	Willow Warbler	*Amber							1			1	08/05	08/05
Sylvia atricapilla	Blackcap						1					1	08/05	08/05
Sylvia curruca	Lesser Whitethroat							1				1	08/05	08/05
Troglodytidae														
Troglodytes troglodytes	Wren						1		1			2	10/06	10/06

APPENDIX C - List of recorded species

Aves (Birds) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Turdidae														
Erithacus rubecula	Robin						1	1	1			3	18/05	12/06
Phoenicurus phoenicurus	Redstart	*Amber							2			2	07/06	10/06
Turdus iliacus	Redwing	*Amber							1			1	13/02	13/02
Turdus merula	Blackbird						2		2			4	18/05	12/06
Turdus viscivorus	Mistle Thrush	*Amber					1		4			5	08/05	25/06
Total Aves species recorded	**33**						**16**	**11**	**24**			**33**		
Total records	**95**						**25**	**16**	**54**			**95**		

Mammalia (Mammals) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Aplodontidae														
Sciurus carolinensis	Grey Squirrel								1			1	07/07	07/07
Canidae														
Vulpes vulpes	Fox						1		1			2	10/06	12/06
Cervidae														
Dama dama	Fallow Deer								2			2	12/06	07/07
Leporidae														
Oryctolagus cuniculus	Rabbit						3	2	3			8	28/02	30/06
Muridae														
Apodemus flavicollis	Yellow-necked Mouse								1			1	17/07	17/07
Apodemus sylvaticus	Field Mouse								1			1	17/07	17/07
Clethrionomys glareolus	Bank Vole								1			1	17/07	17/07
Mustelidae														
Meles meles	Badger						1		1			2	28/02	30/06
Talpidae														
Talpa europaea	Mole						1					1	28/02	28/02
Vespertilionidae														
Myotis sp.	Bat sp.						2		1			3	12/06	07/08
Nyctalus noctula	Noctule Bat								1			1	30/06	30/06
Pipistrellus pipistrellus	Pipistrelle Bat (45 KHz)		Y				1	1	2			4	30/06	07/08
Pipistrellus pygmaeus	Pipistrelle Bat (55 KHz)								2			2	30/06	07/08
Total Mammalia species recorded	**13**						**6**	**2**	**12**			**13**		
Total records	**29**						**9**	**3**	**17**			**29**		

APPENDIX C - List of recorded species

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Anobiidae														
Anobium punctatum	Woodworm			X			3		4	7			22/05	21/08
Hemicoelus fulvicornis	a beetle			X			3		3	5		1	25/06	14/08
Ptilinus pectinicornis	Fan-bearing Wood-borer			X					3	3			05/06	19/06
Apionidae														
Ceratapion onopordi	a beetle						2			2			24/07	31/07
Perapion curtirostre	a beetle						2			1		1	25/06	07/08
Protapion apricans	Clover Seed Weevil						1			1			12/06	12/06
Protapion assimile	Clover Seed Weevil							1				1	19/05	19/05
Protapion fulvipes	White Clover Seed Weevil								1	1			12/06	12/06
Protapion nigritarse	a beetle						1		2	2		1	19/05	12/06
Protapion trifolii	Clover Seed Weevil								1	1			12/06	12/06
Taeniapion urticarium	a beetle						1					1	19/05	19/05
Byturidae														
Byturus tomentosus	Raspberry Beetle							1	1			2	19/05	19/05
Cantharidae														
Cantharis decipiens	a soldier beetle						1	1		1		1	08/05	22/05
Cantharis lateralis	a soldier beetle						1		3	4			12/06	14/08
Cantharis livida	a soldier beetle						1		1	2			05/06	05/06
Cantharis nigra	a soldier beetle						3		5	8			12/06	10/07
Cantharis pallida	a soldier beetle						3		2	4		1	25/06	10/07
Cantharis rufa	a soldier beetle						3		2	4		1	19/05	19/06
Cantharis rustica	a soldier beetle						5	1	5	8		3	15/05	07/07
Malthinus flaveolus	a soldier beetle								1	1			10/07	10/07
Malthodes fuscus	a soldier beetle			X			1		1	2			12/06	19/06
Malthodes marginatus	a soldier beetle			X				1				1	25/06	25/06
Malthodes minimus	a soldier beetle			X			1		1	2			26/06	26/06
Rhagonycha fulva	Common red soldier beetle						3		2	4		1	10/07	07/08
Rhagonycha lignosa	a soldier beetle						1		1	1		1	15/05	19/05
Rhagonycha limbata	a soldier beetle						1		2	2		1	19/05	26/06
Rhagonycha testacea	a soldier beetle							1				1	19/05	19/05
Carabidae														
Abax parallelepipedus	a ground beetle								1			1	19/05	19/05
Amara aenea	Common Sun Beetle						1					1	08/05	08/05
Amara plebeja	a ground beetle							1	2			3	19/05	31/07
Bembidion guttula	a ground beetle						1			1			22/05	22/05
Calathus fuscipes	a ground beetle						1			1			07/08	07/08
Dromius quadrimaculatus	a ground beetle			X			1	1	1	2		1	19/05	06/11
Harpalus affinis	a ground beetle						1			1			06/11	06/11
Harpalus rubripes	a ground beetle							1				1	19/05	19/05
Harpalus rufipes	Strawberry Seed Beetle						2					2	08/05	19/05
Nebria brevicollis	a ground beetle						2	1	1			4	28/02	08/05
Pterostichus madidus	Black Clock						3		1			4	28/02	31/07
Pterostichus niger	a ground beetle						1					1	08/05	08/05
Pterostichus strenuus	a ground beetle						1					1	19/05	19/05
Pterostichus vernalis	a ground beetle						1					1	28/02	28/02
Catopidae														
Catops sp.	a carrion beetle								1	1			06/11	06/11
Choleva angustata	a round fungus beetle						1			1			06/11	06/11

APPENDIX C - List of recorded species

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Cerambycidae														
Alosterna tabacicolor	a longhorn beetle			X					1			1	07/07	07/07
Anaglyptus mysticus	a longhorn beetle	*N		X					1			1	19/05	19/05
Clytus arietis	Wasp Beetle			X				1	1			2	19/05	07/07
Grammoptera ruficornis	a longhorn beetle			X			1		9	8		2	19/05	10/07
Leiopus nebulosus	a longhorn beetle			X			1					1	25/06	25/06
Rhagium bifasciatum	a longhorn beetle			X			1		1	2			22/05	22/05
Rhagium mordax	a longhorn beetle			X			1			1			15/05	15/05
Rutpela maculata	a longhorn beetle								1			1	07/07	07/07
Stenocorus meridianus	a longhorn beetle			X					1			1	07/07	07/07
Strangalia quadrifasciata	a longhorn beetle			X					1	1			07/08	07/08
Tetrops praeusta	a longhorn beetle			X				1	2	1		2	08/05	22/05
Chrysomelidae														
Altica lythri	a leaf beetle								1	1			08/05	08/05
Altica palustris	a leaf beetle								1	1			29/05	29/05
Aphthona euphorbiae	Large Flax Flea Beetle						5		3	8			19/03	19/06
Aphthona lutescens	a leaf beetle						1			1			22/05	22/05
Apteropeda orbiculata	a leaf beetle						1		1	2			19/06	10/07
Batophila aerata	Raspberry Flea Beetle						1		1	2			22/05	22/05
Cassida rubiginosa	Thistle Tortoise Beetle							1				1	19/05	19/05
Chaetocnema concinna	Beet Flea Beetle						1		1	2			15/05	07/08
Chaetocnema hortensis	a leaf beetle						1		1	2			12/06	11/09
Chalcoides aurata	Willow Flea Beetle								1	1			12/06	12/06
Chalcoides aurea	a leaf beetle						1			1			15/05	15/05
Crepidodera ferruginea	a leaf beetle						1			1			28/08	28/08
Cryptocephalus pusillus	a leaf beetle						2			2			05/09	19/09
Longitarsus luridus	a leaf beetle						9		10	19			06/03	19/09
Longitarsus melanocephalus	a leaf beetle						8		7	15			06/03	05/09
Longitarsus membranaceus	a leaf beetle								1	1			14/08	14/08
Longitarsus pratensis	a leaf beetle						2			2			09/04	08/05
Mniophila muscorum	Moss Flea Beetle	*N							1	1			29/05	29/05
Oulema lichenis	a leaf beetle							1	2	1		2	19/05	14/08
Oulema melanopa	Cereal Leaf Beetle								1	1			22/05	22/05
Phyllotreta atra	Turnip Flea Beetle						2	1	2	4		1	02/04	19/05
Phyllotreta nemorum	Turnip Flea Beetle						2			2			08/05	05/06
Phyllotreta nigripes	Turnip Flea Beetle						3			3			17/04	11/09
Phyllotreta undulata	Small Turnip Flea Beetle						1		3	4			08/05	07/08
Psylliodes affinis	Potato Flea Beetle						2			2			15/05	05/06
Sphaeroderma sp.	a thistle beetle						1			1			14/08	14/08
Cleridae														
Tillus elongatus	a chequered beetle	*N		X			1		1	2			29/05	12/06
Coccinellidae														
Adalia bipunctata	Two-spot Ladybird						1		2	2		1	08/05	19/09
Adalia decempunctata	Ten-spot Ladybird						1					1	25/06	25/06
Calvia quattuordecimguttata	a ladybird						1					1	25/06	25/06
Coccinella septempunctata	Seven-spot Ladybird						5		6	7		4	24/04	06/11
Exochomus quadripustulatu	a ladybird							1	4	4		1	19/03	19/09
Halyzia sedecimguttata	16-spot Ladybird								1	1			03/07	03/07
Propylea quattuordecimpunc	14-spot Ladybird						5	1	5	10		1	24/04	05/09
Psyllobora vigintiduopunctat	a ladybird						1			1			14/08	14/08
Rhizobius litura	a ladybird						2	1	1	2		2	19/05	31/07
Tytthaspis sedecimpunctata	16-spot Ladybird						3	1	3	6		1	19/05	21/08

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Corylophidae														
Sericoderus lateralis	a minute fungus beetle						3			3			22/05	11/09
Cryptophagidae														
Atomaria rubella	a silken fungus beetle								1	1			15/05	15/05
Axinotarsus marginalis	a malachite beetle			X			1		3	4			26/06	17/07
Micrambe vini	a silken fungus beetle						1		1	1		1	06/03	08/05
Curculionidae														
Alophus triguttatus	a weevil						1			1			09/04	09/04
Anthonomus rubi	Strawberry Blossom Weevil								2	2			12/06	19/06
Barynotus obscurus	a weevil						1					1	08/05	08/05
Ceutorhynchus erysimi	a weevil						1			1			17/04	17/04
Ceutorhynchus floralis	a weevil								2	2			29/05	05/06
Ceutorhynchus pollinarius	a weevil							1				1	18/05	18/05
Ceutorhynchus quadridens	Cabbage Stem Weavil						2			2			08/05	15/05
Cidnorhinus quadrimaculatu	Small Nettle Weevil								1			1	19/05	19/05
Cionus hortulanus	a weevil						1					1	19/05	19/05
Curculio glandium	Acorn Weevil								1			1	08/05	08/05
Curculio salicivorus	Willow Gall Weevil								1			1	25/06	25/06
Euophryum confine	Wood-boring Weevil			X			1					1	28/02	28/02
Hypera punctata	a weevil						1		3	4			11/09	06/11
Magdalis barbicornis	Pear Weevil	*N		X					3	3			05/06	19/06
Magdalis cerasi	a weevil	*N		X				1				1	19/05	19/05
Magdalis ruficornis	a weevil			X			1			1			24/07	24/07
Mecinus pyraster	a weevil						2			2			15/05	25/09
Otiorhynchus ligneus	a weevil						4			4			14/08	05/09
Otiorhynchus singularis	Raspberry Weevil								1			1	28/02	28/02
Phyllobius pomaceus	a weevil						2		2			4	08/05	07/07
Phyllobius pyri	Common Leaf Weevil						10	1	5	13		3	24/04	26/06
Phyllobius roboretanus	Small Green Nettle Weevil						3	1	7	9		2	24/04	26/06
Phyllobius viridiaeris	Green Nettle Weevil								1	1			12/06	12/06
Rhampus pulicarius	a weevil						1			1			10/07	10/07
Rhinocyllus conicus	a weevil	*N							1			1	25/06	25/06
Rhinoncus pericarpius	a weevil						1					1	19/05	19/05
Rhynchaenus alni	a weevil								1	1			17/04	17/04
Rhynchites aequatus	Apple Fruit Rhynchites						1		2	1		2	19/05	17/07
Sciaphilus asperatus	Strawberry Root Weevil						1			1			08/05	08/05
Sitona cambricus	a beetle								1	1			08/05	08/05
Sitona cylindricollis	a weevil								2	2			12/06	14/08
Sitona hispidulus	Clover Weevil						3		1	3		1	25/06	06/11
Sitona lineatus	Pea and Bean Weevil						9	1	13	21		2	19/03	02/10
Sitona puncticollis	a weevil								1	1			15/05	15/05
Sitona suturalis	a weevil						1			1			07/08	07/08
Strophosoma capitatum	a weevil						3			2		1	08/05	05/06
Trichosirocalus troglodytes	a weevil								1			1	19/05	19/05
Tychius picirostris	a weevil						1			1			24/07	24/07
Dermestidae														
Aderus oculatus	a beetle	*N		X			1			1			05/06	05/06
Megatoma undata	a museum or larder beetle	*N		X			1			1			12/06	12/06

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Elateridae														
Agriotes acuminatus	a click beetle								1	1			08/05	08/05
Agriotes lineatus	a click beetle						2		1	2		1	08/05	12/06
Agriotes obscurus	a click beetle						1	1	3	3		2	19/05	12/06
Agriotes pallidulus	a click beetle						1	1	3	2		3	15/05	19/06
Agriotes sputator	a click beetle						1	1	2	2		2	19/05	03/07
Agrypnus murinus	a click beetle						1			1			29/05	29/05
Athous bicolor	a click beetle						3		1	4			10/07	07/08
Athous haemorrhoidalis	a click beetle						1	1	2	1		3	19/05	22/05
Athous hirtus	a click beetle						1		1	2			26/06	03/07
Dalopius marginatus	a click beetle								1			1	08/05	08/05
Denticollis linearis	a click beetle			X			1			1			29/05	29/05
Kibunea minutus	a click beetle							1				1	19/05	19/05
Melanotus villosus	a click beetle			X			1			1			12/06	12/06
Endomychidae														
Sphaerosoma piliferum	a false ladybird						1			1			22/05	22/05
Eucnemidae														
Melasis buprestoides	a false click beetle	*N		X					2	2			22/05	12/06
Hydrophilidae														
Cercyon quisquilius	a scavenger water beetle				X				1			1	25/06	25/06
Sphaeridium scarabaeoides	a scavenger water beetle				X				2			2	25/06	31/07
Lathridiidae														
Aridius bifasciatus	a mould beetle						7		4	11			17/04	02/10
Aridius nodifer	a mould beetle						5		5	10			17/04	06/11
Corticaria impressa	a mould beetle						3			3			22/05	07/08
Corticarina fuscula	a mould beetle						5		6	11			08/05	12/06
Cortinicara gibbosa	a mould beetle						7		7	14			29/05	05/09
Dienerella filum	Herbarium Beetle						1			1			15/05	15/05
Lathridius minutus	a mould beetle								1	1			24/04	24/04
Leiodidae														
Anisotoma humeralis	a round fungus beetle			X					1	1			17/07	17/07
Liocyrtusa vittata	a round fungus beetle						1			1			19/06	19/06
Ptomaphagus medius	a round fungus beetle						4		5	9			15/05	03/07
Ptomaphagus subvillosus	a round fungus beetle						10		6	16			19/03	11/09
Melandryidae														
Abdera quadrifasciata	a false darkling beetle	*N		X					1	1			21/08	21/08
Melyridae														
Malachius bipustulatus	Malachite Beetle			X			2	1	2	1		4	19/05	07/07
Orchesia undulata	a false darkling beetle			X			3		1	4			26/06	21/08
Nitidulidae														
Brachypterus glaber	a pollen or sap beetle						2			2			22/05	05/06
Epurea melanocephala	a pollen or sap beetle								1	1			24/04	24/04
Glischrochilus hortensis	a pollen or sap beetle			X			1			1			14/08	14/08
Kateretes rufilabris	a pollen or sap beetle							1				1	19/05	19/05
Meligethes aeneus	Common Pollen Beetle						9	1	13	20		3	19/03	31/07
Meligethes atratus	a pollen or sap beetle								1			1	08/05	08/05
Meligethes nigrescens	a pollen or sap beetle						5		4	9			02/04	07/08
Meligethes viridescens	a pollen or sap beetle						9		11	18		2	02/04	14/08
Oedemeridae														
Oedemera nobilis	a thick-legged beetle						1			1			12/06	12/06
Phalacridae														
Stilbus testaceus	a smut beetle						2		1	3			22/05	17/07
Pyrochroidae														
Pyrochroa serraticornis	Common Cardinal Beetle			X			1			1			12/06	12/06
Rhizophagidae														
Monotoma longicollis	a narrow bark beetle				X		1					1	25/06	25/06
Rhizophagus bipustulatus	a narrow bark beetle			X			2			1		1	25/06	21/08

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Scarabaeidae														
Aphodius ater	a dung beetle or chafer				X				1			1	25/06	25/06
Aphodius sphacelatus	a dung beetle or chafer				X		1					1	31/03	31/03
Gnorimus nobilis	Noble Chafer	V	Y	X					1			1	07/07	07/07
Hoplia philanthus	Welsh Chafer						1					1	25/06	25/06
Scaphidium quadrimaculatu	a shining fungus beetle			X					2	2			22/05	19/06
Scirtidae														
Elodes minuta	a beetle						1					1	19/05	19/05
Scolytidae														
Leperisinus varius	Ash Bark Beetle								1	1			17/04	17/04
Phloeophthorus rhododactyl	a bark or ambrosia beetle								1	1			31/07	31/07
Scolytus mali	Large Fruit Bark Beetle	*N		X			1		1	2			07/08	21/08
Scolytus multistriatus	Small Elm Bark Beetle			X					4	4			12/06	17/07
Scolytus rugulosus	Fruit Bark Beetle			X			2		1	2		1	22/05	10/07
Xyloterus domesticus	a bark or ambrosia beetle								1	1			19/03	19/03
Scraptiidae														
Anaspis costae	a tumbling flower beetle						2	1	3	3		3	19/05	07/08
Anaspis garneysi	a tumbling flower beetle			X				1	1	1		1	19/05	22/05
Anaspis humeralis	a tumbling flower beetle						1		1	2			08/05	22/05
Anaspis lurida	a tumbling flower beetle			X			1			1			15/05	15/05
Anaspis maculata	a tumbling flower beetle			X			5		11	14		2	08/05	17/07
Anaspis regimbarti	a tumbling flower beetle			X			1		2	3			22/05	19/06
Anaspis rufilabris	a tumbling flower beetle			X			2		2	4			05/06	26/06
Mordellistena neuwaldeggia	a tumbling flower beetle	RDBK		X					3	3			19/06	14/08
Mordellistena variegata	a tumbling flower beetle								3	3			17/07	31/07
Staphylinidae														
Anotylus sculpturatus	a rove beetle				X		2		1	3			06/03	24/07
Astenus immaculatus	a rove beetle	*N					1			1			31/07	31/07
Atheta elongatula	a rove beetle								1	1			02/04	02/04
Atheta fungi	a rove beetle						1			1			19/03	19/03
Bolitobius analis	a rove beetle						1		1	2			02/04	10/07
Coryphium angusticolle	a rove beetle			X					3	3			27/03	06/11
Cypha longicornis	a rove beetle						1		1	2			29/05	14/08
Gabrius nigritulus	a rove beetle						1			1			05/06	05/06
Ocypus aeneocephalus	a rove beetle						1			1			06/11	06/11
Ontholestes murinus	a rove beetle				X				1	1			29/05	29/05
Parocyusa longitarsis	a rove beetle						1			1			02/04	02/04
Philonthus decorus	a rove beetle								1	1			22/05	22/05
Philonthus fimetarius	a rove beetle				X				1	1			19/03	19/03
Platydracus stercorarius	a rove beetle				X		1			1			31/07	31/07
Platystethus arenarius	a rove beetle				X				1	1			03/07	03/07
Proteinus ovalis	a rove beetle						1			1			06/11	06/11
Quedius cinctus	a rove beetle						1			1			23/10	23/10
Quedius mesomelinus	a rove beetle								1	1			17/04	17/04
Silvanus unidentatus	a rove beetle			X					1	1			22/05	22/05
Stenus subaeneus	a rove beetle						1		1	2			07/08	06/11
Tachinus laticollis	a rove beetle				X				1	1			24/07	24/07
Tachinus marginellus	a rove beetle				X		1			1			12/06	12/06
Tachinus signatus	a rove beetle				X		6		5	11			22/05	14/08
Tachyporus chrysomelinus	a rove beetle						6	1	4	10		1	02/04	07/08
Tachyporus chrysomelinus agg.[2]	a rove beetle						1		1	2			05/09	02/10
Tachyporus hypnorum	a rove beetle						9		3	11		1	31/03	02/10
Tachyporus nitidulus	a rove beetle						2			2			05/06	10/07
Tachyporus pallidus	a rove beetle						1			1			24/04	24/04

Coleoptera (Beetles) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Tenebrionidae														
Cylindrinotus laevioctostriatus	a darkling beetle			X			15	1	6	13		9	28/02	06/11
Prionychus ater	a darkling beetle	*N		X			1	1		1		1	25/06	17/07
Throscidae														
Trixagus carinifrons	a false click beetle						2			2			05/09	11/09
Total Coleoptera species recorded	**230**			**50**	**13**		**153**	**37**	**145**	**181**		**94**		
Total records	**732**						**349**	**37**	**346**	**586**		**146**		

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Agromyzidae														
Agromyza johannae	Broom leaf miner								2	2			24/04	22/05
Agromyza mobilis	a leaf-mining fly								1	1			22/05	22/05
Agromyza nigrociliata	Grass leaf miner						1		1	2			01/05	22/05
Agromyza pseudoreptans/ pseudorufipes	a leaf-mining fly								1	1			22/05	22/05
Agromyza sp.	a leaf-mining fly						1			1			05/09	05/09
Aulagromyza anteposita	Galium stem miner						1		2	3			17/04	01/05
Aulagromyza cornigera	Honeysuckle leaf miner								1	1			09/04	09/04
Cerodontha denticornis	a leaf-mining fly						2		1	3			11/09	23/10
Chromatomyia milii	a leaf-mining fly						5		1	6			19/03	01/05
Chromatomyia nigra	a leaf-mining fly						1			1			24/04	24/04
Liriomyza flaveola	a leaf-mining fly						2		1	3			24/04	23/10
Liriomyza orbona	a leaf-mining fly						2			2			24/04	01/05
Liriomyza richteri	Grass leaf miner						1			1			01/05	01/05
Phytomyza cineracea	Buttercup stem borer						2		2	4			09/04	01/05
Phytomyza continua	Thistle leaf miner						2			2			24/04	01/05
Phytomyza flavicornis	Stinging nettle stem miner						2		2	4			24/04	01/05
Phytomyza ranunculi	a buttercup leaf miner						2	1	4	6		1	01/03	22/05
Phytomyza ranunculi agg.[2]	a leaf-mining fly						1		2	3			02/10	06/11
Anisopodidae														
Sylvicola cinctus	Window gnat			X			4		3	7			02/04	06/11
Sylvicola punctatus	Compost midge				X		8		5	13			24/04	06/11
Anthomyiidae														
Adia cinerella	a fly				X		5		3	8			17/04	14/08
Anthomyia liturata	a fly						9		12	21			24/04	11/09
Anthomyia pluvialis	a fly						1			1			24/04	24/04
Anthomyia procellaris	a fly			X			2		1	3			05/09	25/09
Botanophila brunneilinea	a fly						2			2			12/06	19/06
Botanophila fugax	a fly						2		7	9			09/04	02/10
Botanophila silvatica	a fly						4			4			28/08	02/10
Botanophila striolata	a fly						3	1	15	17	2		09/04	14/08
Chirosia histricina	a fly								2	2			22/05	12/06
Delia antiqua	a fly						1		4	5			12/06	14/08
Delia coarctata	a fly						1			1			19/06	19/06
Delia florilega	a fly						1		8	9			17/04	14/08
Delia platura	a fly				X		23		23	46			24/04	06/11
Delia radicum gp.	a fly								2	2			22/05	07/08
Emmesomyia socia	a fly				X				1	1			28/08	28/08
Eutrichota praepotens	a fly								1	1			05/09	05/09
Hylemya urbica	a fly								3	3			19/06	14/08
Hylemya vagans	a fly				X		12		11	23			17/04	16/10
Hylemya variata	a fly				X		26	2	23	44	6	1	28/03	06/11
Hylemyza partita	a fly						10		9	19			31/07	06/11
Lasiomma seminitidum	a fly						5		12	17			13/03	06/11
Leucophora obtusa	a fly						1			1			17/04	17/04
Mycophaga testacea	a fly						1			1			05/09	05/09
Paradelia intersecta	a fly								1	1			19/06	19/06
Pegomya bicolor	a fly						1		1	2			21/08	19/09
Pegomya rufina	a fly						1		1	2			25/09	23/10
Pegomya solennis	a fly								1	1			22/05	22/05
Pegomya winthemi	a fly								2	2			21/08	09/10
Pegomya zonata	a fly						1			1			02/10	02/10
Pegoplata aestiva	a fly						7		10	17			17/04	09/10
Pegoplata juvenilis nitidicauda	a fly						1			1			09/10	09/10
Phorbia sp.	a fly						3			3			28/08	11/09

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Anthomyzidae														
Anthomyza gracilis	a fly								1	1			31/07	31/07
Asilidae														
Choerades marginatus	a robberfly			X					2	2			31/07	11/09
Dioctria linearis	a robberfly						2			2			19/06	10/07
Dioctria rufipes	a robberfly						1	1	1	2		1	19/05	19/06
Leptogaster cylindrica	a robberfly						1		3	3		1	19/06	19/07
Machimus atricapillus	a robberfly						5		7	10		2	19/07	19/09
Machimus cingulatus	a robberfly						2		1	2		1	19/07	11/09
Asteiidae														
Asteia amoena	a small woodland fly			X			12		8	20			17/04	06/11
Bibionidae														
Bibio johannis	Clockwork midge						3		2	5			17/04	01/05
Bolitophilidae														
Bolitophila pseudohybrida	a fungus gnat			X					1	1			23/10	23/10
Bombyliidae														
Bombylius major	Bee Fly						1		1	1		1	01/05	19/05
Calliphoridae														
Bellardia viarum	a fly								1	1			05/09	05/09
Bellardia vulgaris	a fly								1	1			07/08	07/08
Calliphora vicina	a bluebottle								1	1			07/08	07/08
Lucilia ampullacea	a greenbottle						1		2	3			19/09	23/10
Lucilia caesar	Greenbottle								2	2			19/06	26/06
Lucilia illustris	a greenbottle						1			1			31/07	31/07
Lucilia silvarum	a greenbottle								1	1			07/08	07/08
Melanomya nana	a fly								1	1			14/08	14/08
Melinda viridicyanea	Blowfly								3	3			19/03	15/05
Pollenia amentaria	a cluster fly						2		12	14			19/03	05/09
Pollenia angustigena	a cluster fly						12		18	29		1	02/04	06/11
Pollenia griseotomentosa	a cluster fly						1			1			28/08	28/08
Pollenia labialis	a cluster fly								3	3			19/03	14/08
Pollenia pediculata	a cluster fly						4		3	7			19/03	07/08
Pollenia rudis	a cluster fly						1		2	3			19/03	07/08
Camillidae														
Camilla atrimana	a fly						2			2			19/09	02/10
Camilla flavicauda	a fly								1	1			26/06	26/06
Campichoetidae														
Campichoeta punctum	a fly								1	1			17/04	17/04
Ceratopogonidae														
Bezzia sp.	a biting midge					X	1			1			05/09	05/09
Culicoides pulicaris	a biting midge					X	1			1			24/04	24/04
Dasyhelea dufouri	a biting midge					X			1	1			29/05	29/05
Serromyia femorata	a biting midge					X			1	1			29/05	29/05
Chaoboridae														
Chaoborus crystallinus	a phantom midge						2			2			22/05	19/06
Chironomidae														
Bryophaenocladius vernalis	a non-biting midge.						2			2			06/03	13/03
Chaetocladius piger	a non-biting midge.						1			1			13/03	13/03
Chironomus luridus	a non-biting midge.						1			1			27/03	27/03
Limnophyes habilis	a non-biting midge.								1	1			13/03	13/03
Limnophyes minimus	a non-biting midge.								1			1	28/02	28/02
Limnophyes pentaplastus	a non-biting midge.						1			1			13/03	13/03
Micropsectra notescens	a non-biting midge.						2			2			06/03	13/03
Prodiamesa olivacea	a non-biting midge.						1			1			13/03	13/03
Rheocricotopus effusus	a non-biting midge.						2			2			06/03	13/03
Smittia aterrima	a non-biting midge.				X		2	2	2	4		2	01/03	19/03
Smittia contingens	a non-biting midge.				X				1	1			13/03	13/03

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Chloropidae														
Cetema elongatum	a grass fly								1	1			26/06	26/06
Elachiptera cornuta	a grass fly								3	3			17/04	06/11
Elachiptera diastema	a grass fly						1		2	3			01/05	02/10
Meromyza femorata	a grass fly						3		1	4			14/08	05/09
Oscinella frit	a grass fly						1		2	3			05/09	25/09
Oscinella maura	a grass fly								1			1	19/06	19/06
Thaumatomyia glabra	a grass fly								1	1			26/06	26/06
Thaumatomyia notata	a grass fly						2			2			09/04	24/04
Trachysiphonella scutellata	a grass fly								1	1			21/08	21/08
Tricimba cincta	a grass fly			X			1			1			05/09	05/09
Chyromyidae														
Chyromya flava	a fly			X			1			1			19/06	19/06
Clusiidae														
Clusia flava	a fly								1	1			28/08	28/08
Clusiodes albimanus	a fly			X			2		1	3			21/08	05/09
Clusiodes gentilis	a fly			X					1	1			22/05	22/05
Conopidae														
Conops quadrifasciatus	a thick-headed fly						1			1			24/07	24/07
Myopa buccata	a thick-headed fly								1	1			22/05	22/05
Thecophora atra	a thick-headed fly								1	1			31/07	31/07
Culicidae														
Culex pipiens	Common Gnat					X			2	2			19/06	26/06
Culex pipiens agg.[2]	a gnat					X			1	1			02/10	02/10
Diadocidiidae														
Diadocidia ferruginosa	a fungus gnat			X			1		10	11			24/04	09/10
Diadocidia spinosula	a fungus gnat			X			1			1			01/05	01/05
Diadocidia sp.[2]	a fungus gnat								4	4			15/05	10/07
Diastatidae														
Diastata costata	a fungus gnat						1		3	4			05/09	23/10
Diastata fuscula	a fungus gnat						1		4	5			16/10	06/11
Ditomyiidae														
Symmerus annulatus	a fungus gnat			X			3		2	5			22/05	12/06
Dolichopodidae														
Argyra sp.	a fungus gnat						1			1			05/09	05/09
Chrysotus gramineus	a long-headed fly						1		3	4			05/09	02/10
Dolichopus festivus	a long-headed fly						1			1			19/06	19/06
Dolichopus trivialis	a long-headed fly						2		2	3		1	19/06	19/07
Medetera impigra	a long-headed fly			X					2	2			15/05	22/05
Medetera petrophiloides	a long-headed fly			X			1			1			05/09	05/09
Sympycnus desoutteri	a long-headed fly								1	1			05/09	05/09
Xanthochlorus ornatus	a long-headed fly								1	1			31/07	31/07
Drosophilidae														
Drosophila andalusiaca	a fruitfly						9		9	18			06/03	06/11
Drosophila fenestrarum	a fruitfly						5	1	3	8		1	02/04	06/11
Drosophila hydei	a fruitfly								1	1			06/11	06/11
Drosophila obscura	a fruitfly			X			1			1			17/04	17/04
Drosophila phalerata	a fruitfly			X			6		6	12			17/04	06/11
Drosophila subobscura	a fruitfly			X			10		2	12			06/03	19/06
Drosophila transversa	a fruitfly			X			2			2			22/05	19/06
Scaptomyza graminum	a fruitfly						1		1	2			24/04	29/05
Scaptomyza pallida	a fruitfly						12	1	11	23		1	06/03	06/11
Stegana coleoptrata	a fruitfly	*N		X			1			1			24/07	24/07

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Empididae														
Chelifera sp.	a dance fly								2	2			22/05	29/05
Empis aemula	a dance fly						1			1			08/05	08/05
Empis aestiva	a dance fly								1	1			26/06	26/06
Empis chioptera	a dance fly						3		4	7			24/04	29/05
Empis livida	a dance fly						1		1	2			19/06	26/06
Empis nigripes	a dance fly						2		3	5			01/05	29/05
Empis nuntia	a dance fly						4		2	5		1	01/05	22/05
Empis praevia	a dance fly								2	2			22/05	29/05
Empis punctata	a dance fly								2	2			22/05	26/06
Empis scutellata	a dance fly						2			2			22/05	29/05
Empis tessellata	a dance fly						1		3	4			22/05	29/05
Empis tumida	a dance fly						2			2			19/06	26/06
Hilara bistriata	a dance fly								1	1			24/04	24/04
Hilara cornicula	a dance fly								2	2			22/05	29/05
Hilara maura	a dance fly						1		1	2			22/05	22/05
Hilara quadrivittata	a dance fly						1			1			22/05	22/05
Rhamphomyia albohirta	a dance fly						1			1			24/04	24/04
Rhamphomyia crassirostris	a dance fly						1			1			08/05	08/05
Rhamphomyia erythrophtha	a dance fly						1		3	4			05/09	23/10
Rhamphomyia laevipes	a dance fly						3		1	4			01/05	22/05
Rhamphomyia stigmosa	a dance fly								1	1			24/04	24/04
Rhamphomyia subcinerascens	a dance fly						1			1			24/04	24/04
Rhamphomyia sulcata	a dance fly			X			5		1	6			17/04	15/05
Rhamphomyia sulcatella	a dance fly						2		1	3			17/04	22/05
Rhamphomyia tarsata	a dance fly						1			1			29/05	29/05
Rhamphomyia umbripennis	a dance fly								1	1			01/05	01/05
Ephydridae														
Axysta cesta	a marsh fly								1	1			01/05	01/05
Gymnoclasiopa plumosa	a marsh fly								1	1			02/04	02/04
Hyadina guttata	a dance fly						1		1	2			11/09	02/10
Hydrellia maura	a marsh fly						2		3	4		1	22/05	06/11
Limnellia quadrata	a marsh fly						1		4	5			22/05	23/10
Limnellia surturi	a marsh fly						1			1			01/05	01/05
Philygria maculipennis	a marsh fly								2	2			22/05	02/10
Psilopa nitidula	a marsh fly						3		2	5			24/07	02/10
Scatella tenuicosta	a marsh fly								1	1			31/07	31/07
Trimerina madizans	a marsh fly						1		1	2			31/07	14/08
Fanniidae														
Fannia aequilineata	a lesser housefly			X			1		2	3			29/05	12/06
Fannia armata	a lesser housefly						4		6	10			05/06	07/08
Fannia canicularis	a lesser housefly				X		1		6	7			29/05	19/09
Fannia corvina	a lesser housefly								1	1			17/07	17/07
Fannia fuscula	a lesser housefly								2	2			17/07	07/08
Fannia genualis	a lesser housefly								2	2			31/07	19/09
Fannia gotlandica	a lesser housefly	*N		X					1	1			21/08	21/08
Fannia lepida	a lesser housefly								1	1			29/05	29/05
Fannia lustrator	a lesser housefly						1		2	3			29/05	05/06
Fannia manicata	a lesser housefly								2	2			29/05	31/07
Fannia mollissima	Swarming compost fly								2	2			15/05	29/05
Fannia parva	a lesser housefly								2	2			19/06	19/09
Fannia polychaeta	a lesser housefly			X			1		5	6			26/06	09/10
Fannia postica	a lesser housefly			X			1		6	7			19/06	14/08
Fannia serena	Compost fly						9		15	24			15/05	02/10
Fannia similis	a lesser housefly						3		8	11			22/05	31/07
Fannia sociella	a lesser housefly						2		4	6			22/05	03/07

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Fannia subsimilis	a lesser housefly								2	2			22/05	07/08
Fannia umbrosa	a lesser housefly			X			1		3	4			17/07	07/08
Heleomyzidae														
Heleomyza serrata	a fly						1		1	2			19/03	01/05
Heteromyza commixta	a fly								1	1			06/03	06/03
Heteromyza rotundicornis	a fly						2		2	4			09/04	26/06
Oecothea fenestralis	a fly								1	1			06/11	06/11
Scoliocentra amplicornis	a fly								1	1			22/05	22/05
Scoliocentra villosa	a fly						1		1	2			19/03	27/03
Suillia notata	a fly						1			1			19/09	19/09
Suillia parva	a fly								1	1			01/05	01/05
Suillia variegata	a fly			X			11		8	19			02/04	06/11
Tephrochlamys flavipes	a fly			X			3		4	7			09/10	06/11
Tephrochlamys rufiventris	a fly						5			5			19/03	08/05
Tephrochlamys tarsalis	a fly								4	4			19/03	24/04
Hybotidae														
Bicellaria vana	a dance fly								5	5			22/05	25/09
Crossopalpus humilis	Compost / dung fly						2			2			02/04	02/10
Crossopalpus minimus	a dance fly						2		1	3			24/04	22/05
Crossopalpus nigritellus	a dance fly						3		1	4			17/04	25/09
Drapetis assimilis	a dance fly			X			1		1	2			29/05	14/08
Drapetis ephippiata	a dance fly						5		7	12			19/06	25/09
Drapetis exilis	a dance fly						1			1			29/05	29/05
Drapetis parilis	a dance fly						2			2			29/05	05/09
Drapetis pusilla	a dance fly								1	1			14/08	14/08
Euthyneura halidayi	a dance fly			X			1		2	3			08/05	29/05
Euthyneura myrtilli	a dance fly			X					1	1			29/05	29/05
Ocydromia glabricula	a dance fly				X		1		1	2			22/05	19/06
Oedalea apicalis	a dance fly	*NS		X					1	1			26/06	26/06
Oedalea flavipes	a dance fly			X					1	1			22/05	22/05
Oedalea holmgreni	a dance fly			X					1	1			26/06	26/06
Oedalea stigmatella	a dance fly			X					1	1			22/05	22/05
Platypalpus agilis	Thug fly						6		2	7		1	24/04	22/05
Platypalpus aristatus	a dance fly	*N							1	1			29/05	29/05
Platypalpus calceatus	Tiny thug fly						1			1			26/06	26/06
Platypalpus candicans	Thug fly						1		1	2			22/05	19/06
Platypalpus cursitans	Thug fly								1	1			26/06	26/06
Platypalpus leucocephalus	Thug fly						1			1			24/07	24/07
Platypalpus longicornis	Thug fly						4		2	6			22/05	23/10
Platypalpus minutus	Thug fly						3		1	4			22/05	09/10
Platypalpus pallidiventris	Thug fly						4		1	5			29/05	11/09
Tachydromia aemula	a dance fly						1		1	2			29/05	02/10
Tachypeza nubila	Bark thug fly			X			7		8	15			22/05	23/10
Trichina clavipes	a dance fly						1		1	2			19/06	25/09
Trichina elongata	a dance fly						1		1	2			29/05	29/05
Trichinomyia flavipes	a dance fly								1	1			19/09	19/09
Keroplatidae														
Keroplatus testaceus	a fungus gnat	*NS		X			1			1			06/11	06/11
Macrocera centralis	a fungus gnat			X			1			1			11/09	11/09
Macrocera phalerata	a fungus gnat						2		1	3			05/06	19/09
Macrocera stigmoides	a fungus gnat			X			1		4	5			29/05	19/09
Monocentrota lundstroemi	a fungus gnat								3	3			07/08	19/09
Neoplatyura modesta	a fungus gnat						1			1			24/07	24/07
Neoplatyura nigricauda	a fungus gnat						2		2	4			07/08	11/09

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Orfelia discoloria	a fungus gnat						2		6	8			12/06	31/07
Orfelia fasciata	a fungus gnat			X			1			1			11/09	11/09
Orfelia nemoralis	a fungus gnat			X			11		11	22			15/05	07/08
Orfelia nigricornis	a fungus gnat			X			1			1			03/07	03/07
Orfelia unicolor	a fungus gnat			X			1		1	2			12/06	10/07
Urytalpa ochracea	a fungus gnat								1	1			05/06	05/06
Lauxaniidae														
Calliopum aeneum	a fly								2	2			19/06	26/06
Calliopum simillimum	a fly						1			1			06/11	06/11
Cnemacantha muscaria	a fly	NR					1			1			29/05	29/05
Lyciella decipiens	a fly						2		1	3			26/06	05/09
Lyciella stylata	a fly			X					4	4			05/09	06/11
Lyciella subfasciata	a fly								2	2			21/08	16/10
Minettia lupulina	a fly								1			1	19/06	19/06
Minettia rivosa	a fly						6		1	6		1	19/06	02/10
Sapromyza quadricincta	a fly						2			2			19/06	14/08
Sapromyza quadripunctata	a fly						1			1			14/08	14/08
Tricholauxania praeusta	a fly						1			1			16/10	16/10
Limoniidae														
Austrolimnophila ochracea	a cranefly			X			1		2	2		1	22/05	19/09
Cheilotrichia cinerascens	a cranefly						4		3	7			24/04	05/09
Dicranomyia chorea	a cranefly						3			3			19/09	06/11
Dicranomyia didyma	a cranefly								1	1			29/05	29/05
Dicranomyia mitis	a cranefly								1			1	08/05	08/05
Dicranomyia modesta	a cranefly								1	1			23/10	23/10
Epiphragma ocellare	a cranefly			X			1			1			15/05	15/05
Erioconopa trivialis	a cranefly								1	1			23/10	23/10
Erioptera lutea	a cranefly						1			1			24/04	24/04
Molophilus griseus	a cranefly						1			1			22/05	22/05
Molophilus pusillus	a cranefly						1			1			19/03	19/03
Molophilus sp.[2]	a cranefly						1		1	2			02/10	06/11
Neolimnomyia adjuncta	a cranefly						1		1	2			25/09	25/09
Neolimnomyia nemoralis	a cranefly								1	1			19/09	19/09
Neolimonia dumetorum	a cranefly			X			1		1	2			25/09	02/10
Ormosia sp.	a cranefly						1			1			02/10	02/10
Rhipidia maculata	a cranefly			X			7		14	21			01/05	06/11
Lonchaeidae														
Lonchaea chorea	a fly								2	2			22/05	29/05
Lonchaea postica	a fly			X					1	1			22/05	22/05
Lonchopteridae														
Lonchoptera bifurcata	a pointed-wing fly						9		7	11	1	4	06/03	14/08
Lonchoptera lutea	a pointed-wing fly						15	1	17	32		1	19/03	06/11
Micropezidae														
Neria cibaria	a stilt fly								1	1			22/05	22/05
Microphoridae														
Microphor holosericeus	a fly						4		2	5		1	01/05	29/05
Muscidae														
Achanthiptera rohrelliformis	a fly								2	2			24/07	31/07
Azelia cilipes	a fly				X		3		5	8			29/05	06/11
Azelia gibbera	a fly						1			1			28/08	28/08
Azelia nebulosa	a fly				X		2		3	5			17/04	10/07
Azelia triquetra	a fly				X		1			1			08/05	08/05
Azelia zetterstedtii	a fly								6	6			15/05	10/07
Brontaea humilis	a fly				X				1	1			31/07	31/07

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Coenosia agromyzina	a fly						1			1			29/05	29/05
Coenosia albicornis	a fly						2		2	4			26/06	11/09
Coenosia humilis	a fly								1	1			25/09	25/09
Coenosia testacea	a fly						2		2	4			08/05	19/09
Coenosia tigrina	a fly						3		5	8			22/05	05/09
Eudasyphora cyanella	a fly				X		10		13	23			13/03	06/11
Haematobia irritans	Horn Fly				X				3	3			17/07	07/08
Haematobosca stimulans	a biting fly				X		4		6	10			24/04	10/07
Hebecnema fumosa	a fly				X		1		1	2			28/08	05/09
Hebecnema nigra	a fly						1		1	2			09/04	21/08
Hebecnema umbratica	a fly				X		2		8	10			24/04	07/08
Hebecnema vespertina	a fly				X		1		3	4			15/05	02/10
Helina depuncta	a fly				X		1			1			02/10	02/10
Helina evecta	a fly						2	1	2	4	1		19/03	09/04
Helina impuncta	a fly				X		11		9	20			15/05	06/11
Helina lasiophthalma	a fly								1	1			22/05	22/05
Helina maculipennis	a fly						1			1			09/10	09/10
Helina reversio	a fly				X		15		8	23			24/04	23/10
Helina setiventris	a fly						2		1	3			17/07	24/07
Hydrotaea albipuncta	a fly								2	2			10/07	25/09
Hydrotaea cyrtoneurina	a fly				X		1		1	2			22/05	29/05
Hydrotaea meridionalis	a fly	NR			X				1	1			19/06	19/06
Hydrotaea meteorica	a fly								4	4			15/05	07/08
Hydrotaea tuberculata	a fly				X		1		2	3			15/05	17/07
Lophosceles mutatus	a fly								1	1			24/04	24/04
Mesembrina meridiana	a fly				X		4		5	9			15/05	25/09
Morellia aenescens	a fly				X				2	1		1	22/05	19/06
Morellia simplex	a fly				X				5	5			15/05	17/07
Musca autumnalis	Face Fly				X		4		11	14		1	15/05	28/08
Muscina levida	a fly			X	X		2		3	5			31/07	23/10
Muscina prolapsa	a fly								8	8			15/05	07/08
Mydaea urbana	a fly				X		1		2	3			17/07	19/09
Myospila meditabunda	a fly				X		4		8	12			17/04	25/09
Neomyia cornicina	a fly				X				2	2			02/04	26/06
Neomyia viridescens	a fly				X		2		3	5			01/05	28/08
Phaonia errans	a fly								2	2			22/05	11/09
Phaonia exoleta	a fly	NR		X					2	2			22/05	22/05
Phaonia fuscata	a fly								1	1			17/07	17/07
Phaonia gobertii	a fly			X			1		1	2			05/09	23/10
Phaonia rufiventris	a fly			X			1		1	2			16/10	23/10
Phaonia serva	a fly			X					1	1			22/05	22/05
Phaonia siebecki	a fly	*N							1	1			29/05	29/05
Phaonia subventa	a fly			X					1	1			07/08	07/08
Phaonia trimaculata	a fly						2			2			29/05	06/11
Phaonia valida	a fly						1		1	2			05/09	25/09
Potamia littoralis	a fly			X					1	1			11/09	11/09
Stomoxys calcitrans	Biting housefly				X		20		18	38			27/03	23/10
Mycetophilidae														
Acnemia nitidicollis	a fungus gnat			X			17		20	37			02/04	16/10
Allodia grata	a fungus gnat			X					1	1			29/05	29/05
Allodiopsis domestica	a fungus gnat						1			1			10/07	10/07
Apolephthisa subincana	a fungus gnat			X			5		12	17			24/04	23/10
Boletina basalis	a fungus gnat								1	1			15/05	15/05
Boletina gripha	a fungus gnat						2		5	7			19/03	06/11
Boletina griphoides	a fungus gnat								1	1			01/05	01/05
Boletina nitida	a fungus gnat						1			1			29/05	29/05
Boletina rejecta	a fungus gnat						1			1			17/04	17/04

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Boletina villosa	a fungus gnat	*NS					1			1			16/10	16/10
Brevicornu auriculatum	a fungus gnat						1			1			17/07	17/07
Brevicornu fuscipenne	a fungus gnat						4			4			19/06	07/08
Brevicornu griseicolle	a fungus gnat						8		7	15			17/04	07/08
Brevicornu sericoma	a fungus gnat						1			1			10/07	10/07
Coelosia flava	a fungus gnat						1			1			12/06	12/06
Coelosia tenella	a fungus gnat			X					1	1			06/11	06/11
Cordyla crassicornis	a fungus gnat						10		8	18			06/03	07/08
Cordyla fusca	a fungus gnat								1	1			07/08	07/08
Cordyla murina	a fungus gnat						2			2			22/05	26/06
Docosia fumosa	a fungus gnat								1	1			11/09	11/09
Docosia gilvipes	a fungus gnat			X			2		1	3			08/05	07/08
Ectrepesthoneura hirta	a fungus gnat			X					12	12			01/05	09/10
Epicypta aterrima	a fungus gnat			X					3	3			31/07	14/08
Epicyta sp.[2]	a fungus gnat								1	1			19/09	19/09
Exechia fusca	a fungus gnat			X			2		1	3			26/06	03/07
Exechia parva	a fungus gnat			X					1	1			14/08	14/08
Exechia pseudofestiva	a fungus gnat						1		5	6			10/07	14/08
Exechia repanda	a fungus gnat			X			1		2	3			29/05	14/08
Grzegorzekia collaris	a fungus gnat	*NS		X					1	1			31/07	31/07
Leia bimaculata	a fungus gnat						3		4	7			15/05	25/09
Leia fascipennis	a fungus gnat						10		7	17			29/05	06/11
Leptomorphus walkeri	a fungus gnat			X					1	1			11/09	11/09
Monoclona rufilatera	a fungus gnat			X			4		9	13			01/05	02/10
Mycetophila britannica	a fungus gnat								2	2			24/07	07/08
Mycetophila cingulum	a fungus gnat			X			1		3	4			12/06	23/10
Mycetophila forcipata	a fungus gnat			X					1	1			24/04	24/04
Mycetophila formosa	a fungus gnat			X					2	2			19/09	23/10
Mycetophila fungorum	a fungus gnat			X			2		7	9			24/07	06/11
Mycetophila fungorum agg.[2]	a fungus gnat								1	1			23/10	23/10
Mycetophila luctuosa	a fungus gnat			X					1	1			14/08	14/08
Mycetophila signatoides	a fungus gnat								1	1			24/07	24/07
Mycetophila sp.[2]	a fungus gnat						1		3	4			02/04	03/07
Mycetophila strigata	a fungus gnat								1	1			17/07	17/07
Mycetophila trinotata	a fungus gnat			X			3		5	8			01/05	07/08
Mycomya annulata	a fungus gnat			X					1	1			06/11	06/11
Mycomya marginata	a fungus gnat			X			1			1			03/07	03/07
Mycomya winnertzi	a fungus gnat			X					1	1			07/08	07/08
Mycomyia sp.	a fungus gnat								1	1			11/09	11/09
Neoempheria pictipennis	a fungus gnat			X					1	1			06/11	06/11
Phronia basalis	a fungus gnat			X					1	1			19/03	19/03
Phronia forcipata	a fungus gnat								2	2			29/05	07/08
Phronia nigricornis	a fungus gnat								1	1			07/08	07/08
Phronia nitidiventris	a fungus gnat			X					1	1			14/08	14/08
Phronia sp.	a fungus gnat						2			2			06/03	13/03
Phronia strenua	a fungus gnat			X					1	1			17/07	17/07
Phthinia humilis	a fungus gnat			X					1	1			22/05	22/05
Phthinia mira	a fungus gnat								1	1			15/05	15/05
Phthinia winnertzi	a fungus gnat			X					1	1			11/09	11/09
Platurocypta punctum	a fungus gnat			X					4	4			03/07	14/08
Platurocypta testata	a fungus gnat			X			1		5	6			12/06	14/08
Pseudexechia trivittata	a fungus gnat				X		1			1			07/08	07/08
Rondaniella dimidiata	a fungus gnat			X			1			1			16/10	16/10
Sceptonia fumipes	a fungus gnat								13	13			24/04	14/08
Sceptonia nigra	a fungus gnat						3		1	4			24/07	14/08

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Sciophila geniculata	a fungus gnat	*NS		X			2		4	6			05/09	09/10
Sciophila hirta	a fungus gnat			X					2	2			24/04	01/05
Sciophila lutea	a fungus gnat			X			5		4	9			17/04	07/08
Sciophila nonnisilva	a fungus gnat			X					9	9			01/05	07/08
Trichonta subfusca	a fungus gnat								1	1			26/06	26/06
Zygomyia humeralis	a fungus gnat								1	1			03/07	03/07
Zygomyia notata	a fungus gnat						7		8	15			29/05	14/08
Zygomyia pictipennis	a fungus gnat						1		1	2			17/04	12/06
Zygomyia sp.	a fungus gnat						1			1			05/09	05/09
Zygomyia valida	a fungus gnat						3		3	6			22/05	07/08
Zygomyia vara	a fungus gnat						1		1	2			31/07	14/08
Opomyzidae														
Geomyza balachowskyi	a fly						2		4	6			05/09	06/11
Geomyza tripunctata	a fly						7		9	16			01/05	06/11
Opomyza florum	a fly						3		2	5			09/10	06/11
Opomyza germinationis	a fly						7		8	14		1	29/05	06/11
Opomyza petrei	a fly						2		4	5		1	19/06	05/09
Pallopteridae														
Palloptera scutellata	a picture-wing fly						4		3	7			19/03	29/05
Piophilidae														
Parapiophila vulgaris	a fly						2		2	4			24/04	08/05
Pipunculidae														
Eudorylas subterminalis	a big-headed fly								1	1			22/05	22/05
Pipunculus campestris	a big-headed fly						4		3	7			22/05	25/09
Platypezidae														
Polyporivora ornata	a flat-footed fly			X					1	1			01/05	01/05
Psilidae														
Chamaepsila nigricornis	Carrot fly						1			1			15/05	15/05
Chamaepsila obscuritarsis	a fly						3		1	4			22/05	19/06
Chamaepsila rosae	a fly						1			1			22/05	22/05
Psila rosae/nigricornis	a fly						2		1	3			22/05	11/09
Psychodidae														
Boreoclytocerus ocellaris	an owl midge						2		3	5			29/05	09/10
Psychoda albipennis	an owl midge				X		1		1	2			29/05	29/05
Psychoda brevicornis	an owl midge				X				1	1			29/05	29/05
Psychoda crassipenis	an owl midge								1	1			29/05	29/05
Psychoda grisescens	an owl midge				X		1		1	2			13/03	29/05
Psychoda minuta	an owl midge				X		1			1			29/05	29/05
Psychoda phalaenoides	an owl midge				X		4		1	5			13/03	29/05
Psychoda trinodulosa	an owl midge				X		1		1	2			29/05	29/05
Tinearia alternata	an owl midge						1			1			11/09	11/09
Ptychopteridae														
Ptychoptera albimana	a cranefly			X			1			1			08/05	08/05
Rhagionidae														
Chrysopilus asiliformis	a snipefly						1					1	19/07	19/07
Chrysopilus cristatus	a snipefly						1		1			2	19/06	19/07
Rhagio scolopaceus	a snipefly								1	1			22/05	22/05
Rhinophoridae														
Paykullia maculata	a fly			X					1	1			14/08	14/08
Rhinophora lepida	a fly			X			10		11	21			12/06	21/08
Tricogena rubricosa	a fly						4		7	11			12/06	14/08

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Sarcophagidae														
Brachicoma devia	a fleshfly						1		1	2			07/08	07/08
Ravinia pernix	a fleshfly								1	1			07/08	07/08
Sarcophaga aratrix	a fleshfly								1	1			05/06	05/06
Sarcophaga caerulescens	a fleshfly								1	1			21/08	21/08
Sarcophaga carnaria	a fleshfly						7		10	17			24/07	09/10
Sarcophaga crassimargo	a fleshfly						2		3	5			10/07	28/08
Sarcophaga dissimilis	a fleshfly						1			1			07/08	07/08
Sarcophaga haemorrhoa	a fleshfly						1		1	2			07/08	28/08
Sarcophaga incisilobata	a fleshfly						1		1	2			31/07	31/07
Sarcophaga melanura	a fleshfly								1	1			28/08	28/08
Sarcophaga nigriventris	a fleshfly						2			2			07/08	28/08
Sarcophaga subvicina	a fleshfly						4		7	11			22/05	28/08
Sarcophaga vagans	a fleshfly						1		2	3			07/08	05/09
Sarcophaga variegata	a fleshfly						9		11	19		1	08/05	28/08
Scathophagidae														
Cordilura albipes	a dungfly								2	2			31/07	21/08
Nanna armillata	a timothy fly						1		2	3			01/05	22/05
Nanna fasciata	a timothy fly						5		4	8		1	17/04	29/05
Nanna flavipes	a timothy fly						4		2	6			24/04	22/05
Nanna inermis	a timothy fly						1		1	2			24/04	22/05
Nanna tibiella	a timothy fly						1		2	3			24/04	22/05
Norellia spinipes	a dungfly	*N					1			1			19/03	19/03
Norellisoma spinimanum	a dungfly						2		2	4			11/09	06/11
Scathophaga furcata	a dungfly				X		5		7	11		1	19/03	16/10
Scathophaga inquinata	a dungfly						3		3	5		1	17/04	19/07
Scathophaga stercoraria	Yellow Dungfly				X		10	1	13	20		4	06/03	06/11
Scatopsidae														
Apiloscatopse flavicollis	a fly			X					1	1			09/10	09/10
Apiloscatopse picea	a fly						2		2	4			09/10	23/10
Swammerdamella brevicorn	a fly						1			1			24/04	24/04
Sciaridae														
Bradysia confinis	a fungus gnat			X			1			1			24/04	24/04
Bradysia fungicola	a fungus gnat			X			6		1	7			02/04	12/06
Bradysia inusitata	a fungus gnat								1	1			15/05	15/05
Bradysia nitidicollis	a fungus gnat						3		3	6			17/04	15/05
Bradysia polonica	a fungus gnat						1			1			15/05	15/05
Bradysia scabricornis	a fungus gnat						2		1	3			15/05	12/06
Bradysia sp.	a fungus gnat						1			1			22/05	22/05
Bradysia trivittata	a fungus gnat						6		6	12			02/04	12/06
Corynoptera compressa	a fungus gnat						1			1			06/03	06/03
Corynoptera flavicauda	a fungus gnat						4		1	5			08/05	29/05
Corynoptera forcipata	a fungus gnat								1	1			05/06	05/06
Cratyna vagabunda	a fungus gnat						2		4	6			22/05	12/06
Ctenosciara hyalipennis	a fungus gnat			X			1		1	2			02/04	01/05
Leptosciarella rejecta	a fungus gnat			X					3	3			22/05	05/06
Leptosciarella scutellata	a fungus gnat			X					1	1			29/05	29/05
Leptosciarella subpilosa	a fungus gnat						3		3	6			08/05	05/06
Leptosciarella trochanterata	a fungus gnat			X			1		3	4			01/05	22/05
Leptosciarella viatica	a fungus gnat			X			7		7	14			06/03	24/04
Lycoriella castanescens	a fungus gnat						5		4	9			13/03	12/06
Lycoriella ingenua	a fungus gnat			X			5		5	10			13/03	29/05
Lycoriella lundstroemi	a fungus gnat			X			1			1			13/03	13/03
Phytosciara flavipes	a fungus gnat								2	2			27/03	01/05

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Scatopsciara atomaria	a fungus gnat			X			2			2			06/03	15/05
Scatopsciara nana	a fungus gnat						1		1	2			06/03	13/03
Scatopsciara neglecta	a fungus gnat								1	1			12/06	12/06
Scatopsciara tricuspidata	a fungus gnat			X			1			1			15/05	15/05
Schwenckfeldina carbonaria	a fungus gnat						1		4	5			15/05	05/09
Scythropochroa radialis	a fungus gnat			X					3	3			29/05	12/06
Trichosia basdeni	a fungus gnat						4			4			15/05	05/06
Trichosia confusa	a fungus gnat								1	1			12/06	12/06
Trichosia glabra	a fungus gnat			X					1	1			22/05	22/05
Trichosia morio	a fungus gnat			X					1	1			05/06	05/06
Trichosia splendens	a fungus gnat								1	1			05/06	05/06
Zygoneura sciarina	a fungus gnat			X			1			1			11/09	11/09
Sciomyzidae														
Limnia paludicola	a snail-killing fly						1			1			19/06	19/06
Limnia unguicornis	a snail-killing fly						5			2		3	19/05	19/07
Limnia unguicornis agg.[2]	a snail-killing fly								1	1			21/08	21/08
Sepsidae														
Saltella sphondylii	a small dungfly				X				1	1			26/06	26/06
Sepsis cynipsea	a small dungfly				X		6	2	1	6	1	2	13/04	06/11
Sepsis duplicata	a small dungfly				X		1			1			01/05	01/05
Sepsis flavimana	a small dungfly				X		2		3	4		1	19/03	22/05
Sepsis fulgens	a small dungfly				X		15		9	23		1	19/03	06/11
Sepsis orthocnemis	a small dungfly				X		6	1	6	12	1		02/04	06/11
Sepsis punctum	a small dungfly				X		2		1	3			28/08	02/10
Sepsis sp.[2]	a small dungfly						1		2	3			11/09	06/11
Sepsis violacea	a small dungfly								1	1			02/04	02/04
Simuliidae														
Simulium aureum gp.	a buffalo gnat					X			1	1			22/05	22/05
Simulium ornatum	a buffalo gnat					X	3		1	4			06/03	17/04
Simulium sp.[2]	a buffalo gnat					X	1				1		13/04	13/04
Sphaeroceridae														
Apteromyia claviventris	a lesser dungfly			X			1		2	3			19/03	17/04
Chaetopodella scutellaris	a lesser dungfly				X		6		2	7		1	31/03	05/09
Coproica ferruginata	a lesser dungfly				X		4		5	9			19/03	29/05
Coproica hirtula	a lesser dungfly						3		1	4			19/03	29/05
Coproica lugubris	a lesser dungfly				X		3		1	4			17/04	01/05
Coproica pusio	a lesser dungfly				X		1		1	2			13/03	09/04
Coproica vagans	a lesser dungfly				X		6		1	6	1		19/03	15/05
Copromyza equina	a lesser dungfly				X		8		2	10			06/03	22/05
Copromyza nigrina	a lesser dungfly						4	1		4	1		06/03	24/04
Copromyza stercoraria	a lesser dungfly				X		4		9	13			19/03	06/11
Crumomyia nigra	a lesser dungfly				X		2			2			17/04	24/04
Crumomyia nitida	a lesser dungfly				X		5		1	6			09/04	08/05
Elachisoma pilosum	a lesser dungfly								1	1			29/05	29/05
Gigalimosina flaviceps	a lesser dungfly				X		2			2			13/03	23/10
Gonioneura spinipennis	a lesser dungfly						6		2	8			06/03	08/05
Ischiolepta denticulata	a lesser dungfly				X		1			1			15/05	15/05
Ischiolepta nitida	a lesser dungfly						2			2			05/09	25/09
Ischiolepta pusilla	a lesser dungfly				X		5		1	6			19/03	06/11
Leptocera anceps	a lesser dungfly								1	1			01/05	01/05
Leptocera nigra	a lesser dungfly				X		4		1	3		2	06/03	29/05
Limosina silvatica	a lesser dungfly				X		4		1	5			19/03	29/05
Lotophila atra	a lesser dungfly				X		5		6	10		1	31/03	06/11
Minilimosina fungicola	a lesser dungfly				X		1		2	3			22/05	14/08
Minilimosina gemella	a lesser dungfly								1	1			14/08	14/08
Minilimosina vitripennis	a lesser dungfly						2		1	3			24/04	09/10

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Opacifrons coxata	a lesser dungfly						2			2			19/03	29/05
Opalimosina mirabilis	a lesser dungfly			X	X				1	1			22/05	22/05
Pseudocollinella humida	a lesser dungfly								1	1			22/05	22/05
Pteremis fenestralis	a lesser dungfly						1		6	7			02/04	14/08
Pullimosina heteroneura	a lesser dungfly				X		1			1			17/04	17/04
Pullimosina moesta	a lesser dungfly						1		3	4			02/04	14/08
Pullimosina pullula	a lesser dungfly								2	2			17/04	14/08
Spelobia baezi	a lesser dungfly								1	1			29/05	29/05
Spelobia clunipes	a lesser dungfly				X		11		6	17			06/03	14/08
Spelobia luteilabris	a lesser dungfly						1			1			24/04	24/04
Spelobia nana	a lesser dungfly				X				3	3			24/04	14/08
Spelobia ochripes	a lesser dungfly								1	1			23/10	23/10
Spelobia palmata	a lesser dungfly				X		6		5	11			17/04	14/08
Spelobia rufilabris	a lesser dungfly								2	2			22/05	14/08
Spelobia talparum	a lesser dungfly						4		6	10			17/04	14/08
Sphaerocera curvipes	a lesser dungfly			X	X		2		1	3			06/03	02/04
Telomerina flavipes	a lesser dungfly						1			1			24/04	24/04
Telomerina pseudoleucopter	a lesser dungfly				X		2		2	4			24/04	22/05
Stratiomyidae														
Beris chalybata	a soldierfly						2		3	5			22/05	19/06
Beris vallata	a soldierfly								3	3			19/06	31/07
Chloromyia formosa	a soldierfly				X				1			1	19/06	19/06
Chorisops tibialis	a soldierfly			X					1	1			31/07	31/07
Sargus bipunctatus	a soldierfly				X				2	2			21/08	28/08
Syrphidae														
Baccha elongata	a hoverfly						1		1	2			31/07	06/11
Cheilosia albitarsis	a hoverfly						1		3	1		3	19/05	22/05
Cheilosia albitarsis/ranunculi[2]	a hoverfly						3	1	4	6		2	15/05	29/05
Cheilosia lasiopa	a hoverfly						1			1			22/05	22/05
Cheilosia pagana	a hoverfly						1			1			14/08	14/08
Cheilosia ranunculi	a hoverfly								1			1	19/05	19/05
Cheilosia variabilis	a hoverfly						1			1			07/08	07/08
Chrysotoxum bicinctum	a hoverfly						1			1			24/07	24/07
Chrysotoxum verralli	a hoverfly						1		1	2			24/07	24/07
Criorhina berberina	a hoverfly			X					1	1			29/05	29/05
Epistrophe eligans	a hoverfly							1	3	2		2	19/05	22/05
Epistrophe grossulariae	a hoverfly						1					1	19/07	19/07
Epistrophe nitidicollis	a hoverfly								1	1			15/05	15/05
Episyrphus balteatus	a hoverfly						8		8	15		1	29/05	21/08
Eristalis interruptus	a hoverfly						1					1	19/07	19/07
Eristalis pertinax	a hoverfly						1		2	2		1	19/07	28/08
Eristalis tenax	a hoverfly								1			1	19/07	19/07
Eumerus ornatus	Lesser bulbfly						1					1	19/05	19/05
Eupeodes bucculatus	a hoverfly								1	1			17/07	17/07
Eupeodes corollae	a hoverfly						7		8	14		1	17/07	05/09
Eupeodes latifasciatus	a hoverfly						1		2	3			01/05	31/07
Eupeodes luniger	a hoverfly						14		12	26			01/05	09/10
Ferdinandea cuprea	a hoverfly			X					1	1			11/09	11/09
Helophilus pendulus	a hoverfly						1		1	2			07/08	05/09
Leucozona lucorum	a hoverfly						1		2	2		1	24/04	22/05
Melangyna lasiophthalma	a hoverfly								2	2			24/04	01/05
Melanostoma mellinum	a hoverfly						18	1	9	24		4	19/05	23/10
Melanostoma scalare	a hoverfly						8		11	18		1	19/05	06/11
Merodon equestris	Greater Bulb-fly						1			1			19/06	19/06
Myathropa florea	a hoverfly			X					2	2			29/05	31/07

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Neoascia podagrica	a hoverfly						1					1	24/04	24/04
Pipiza bimaculata	a hoverfly						1			1			22/05	22/05
Pipizella viduata	a hoverfly						2			1		1	19/07	24/07
Platycheirus albimanus	a hoverfly						6		12	17		1	22/05	25/09
Platycheirus angustatus	a hoverfly						2		5	6		1	19/05	25/09
Platycheirus clypeatus	a hoverfly						5		5	8		2	19/07	14/08
Platycheirus clypeatus agg.[2]	a hoverfly						3		3	6			21/08	02/10
Platycheirus granditarsus	a hoverfly								1	1			14/08	14/08
Platycheirus peltatus	a hoverfly						2		4	6			24/07	05/09
Platycheirus rosarum	a hoverfly						1			1			07/08	07/08
Platycheirus scutatus	a hoverfly						2		4	6			15/05	14/08
Platycheirus scutatus (sl)[2]	a hoverfly						1		2	3			24/07	31/07
Rhingia campestris	a hoverfly				X				4	4			15/05	28/08
Scaeva pyrastri	a hoverfly								1	1			14/08	14/08
Sphaerophoria scripta	a hoverfly						6		9	13		2	10/07	16/10
Sphaerophoria sp.[2]	a hoverfly						5		6	11			10/07	11/09
Syritta pipiens	a hoverfly						1		2	2		1	19/05	21/08
Syrphus ribesii	a hoverfly						9		7	14		2	19/05	23/10
Syrphus vitripennis	a hoverfly						1					1	19/07	19/07
Xylota abiens	a hoverfly	*N		X					1	1			29/05	29/05
Xylota segnis	a hoverfly			X					2	2			22/05	29/05
Xylota sylvarum	a hoverfly			X			2		6	8			24/07	28/08
Tabanidae														
Haematopota pluvialis	a horsefly					X			1	1			26/06	26/06
Hybomitra distinguenda	a horsefly					X	1			1			17/07	17/07
Tabanus bromius	a horsefly					X			1	1			24/07	24/07
Tachinidae														
Actia crassicornis	a parasitefly						1			1			05/06	05/06
Carcelia tibialis	a parasitefly						4		1	5			10/07	31/07
Dinera carinifrons	a parasitefly								5	5			19/06	11/09
Dinera grisescens	a parasitefly								1	1			28/08	28/08
Dufouria chalybeata	a parasitefly								1	1			12/06	12/06
Entomophaga nigrohalterata	a parasitefly								1	1			22/05	22/05
Epicampocera succincta	a parasitefly						1		2	3			21/08	11/09
Eriothrix rufomaculata	a parasitefly						8		11	19			10/07	19/09
Eurithia anthophila	a parasitefly						1		1	2			21/08	05/09
Eurithia consobrina	a parasitefly						1			1			07/08	07/08
Exorista larvarum	a parasitefly								1	1			07/08	07/08
Exorista rustica	a parasitefly						1		2	3			14/08	11/09
Exorista rustica gp.[2]	a parasitefly						4		4	8			31/07	28/08
Exorista sp.[2]	a parasitefly						1		1	2			10/07	10/07
Gymnocheta viridis	a parasitefly								1	1			15/05	15/05
Loewia foeda	a parasitefly								2	2			24/07	31/07
Lydella stabulans	a parasitefly						1		1	2			19/06	05/09
Lydina aenea	a parasitefly								2	2			12/06	07/08
Lypha dubia	a parasitefly								1	1			01/05	01/05
Macquartia grisea	a parasitefly						1			1			16/10	16/10
Medina collaris	a parasitefly						1		2	3			11/09	09/10
Meigenia sp.	a parasitefly						1			1			19/09	19/09
Nemorilla floralis	a parasitefly								1	1			22/05	22/05
Ocytata pallipes	a parasitefly						5			5			19/06	19/09
Pales pavida	a parasitefly						3		7	10			19/06	05/09
Phania funesta	a parasitefly								1	1			07/08	07/08
Phryxe vulgaris	a parasitefly						3		2	5			10/07	21/08
Phytomyptera cingulata	a parasitefly			X					9	9			05/06	05/09

APPENDIX C - List of recorded species

Diptera (True Flies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Prosena siberita	a parasitefly								1	1			14/08	14/08
Ramonda spathulata	a parasitefly								1	1			29/05	29/05
Solieria pacifica	a parasitefly								1	1			21/08	21/08
Tachina fera	a parasitefly						1		2	3			14/08	16/10
Triarthria setipennis	a parasitefly			X			5		4	9			05/06	10/07
Vibrissina debilitata	a parasitefly								1	1			21/08	21/08
Voria ruralis	a parasitefly								1	1			11/09	11/09
Tephritidae														
Chaetostomella cylindrica	a gall fly						1					1	19/05	19/05
Tephritis neesii	a gall fly								1	1			23/10	23/10
Tephritis vespertina	a gall fly						4			3		1	15/05	19/06
Urophora stylata	a gall fly						1			1			19/06	19/06
Xyphosia miliaria	a gall fly								1	1			26/06	26/06
Tipulidae														
Nephrotoma appendiculata	a cranefly								1	1			05/06	05/06
Nephrotoma quadrifaria	Tiger cranefly						2			2			29/05	26/06
Tanyptera atrata	Comb-horned cranefly			X					1	1			22/05	22/05
Tipula flavolineata	a cranefly			X					2	2			29/05	05/06
Tipula pagana	a cranefly						4		6	10			25/09	06/11
Tipula paludosa	a cranefly						5		4	9			05/09	02/10
Tipula staegeri	a cranefly						1			1			09/10	09/10
Tipula vernalis	Large cranefly						3		3	6			15/05	05/06
Trichoceridae														
Trichocera annulata	a winter gnat			X			2	1	1	3		1	13/04	06/11
Trichocera hiemalis	a winter gnat			X					1			1	01/03	01/03
Trichocera regelationis	a winter gnat							2				2	01/03	01/03
Xylophagidae														
Xylophagus ater	an awl-fly			X			3		2	5			08/05	29/05
Total Diptera species recorded	**659**			**126**	**78**	**12**	**429**	**17**	**512**	**642**	**8**	**70**		
Total records	**2903**						**1290**	**22**	**1591**	**2793**	**15**	**95**		

Hemiptera (True Bugs) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Acanthasomatidae														
Acanthosoma haemorrhoidale	Hawthorn Shieldbug							1				1	19/05	19/05
Berytinidae														
Berytinus crassipes	a stiltbug						1			1			29/05	29/05
Cymus melanocephalus	a stiltbug						1		3	4			22/05	19/06
Cercopidae														
Aphrophora alni	a froghopper						8		6	14			26/06	16/10
Neophilaenus campestris	a froghopper						2		2	4			17/07	24/07
Neophilaenus lineatus	a froghopper						4		6	10			17/07	06/11
Philaenus spumarius	Cuckoo-spit Insect						6		8	13		1	19/05	02/10
Cicadellidae														
Adarrus ocellaris	a leafhopper						1			1			19/06	19/06
Agallia venosa	a leafhopper								1	1			05/06	05/06
Allygus mixtus	a leafhopper						3		4	7			17/07	02/10
Aphrodes bicinctus	a leafhopper						3			3			24/07	07/08
Aphrodes makarovi	a leafhopper						3			3			14/08	28/08
Arboridia ribauti	a leafhopper						3		2	5			05/06	06/11
Balclutha punctata	a leafhopper						6		8	14			21/08	06/11
Cicadella viridis	a leafhopper								1	1			31/07	31/07
Dikraneura variata	a leafhopper						2			2			10/07	31/07
Eupteryx aurata	a leafhopper						5		2	7			26/06	06/11
Eupteryx florida	a leafhopper						1			1			06/11	06/11
Eupteryx stachydearum	a leafhopper						3		2	5			03/07	02/10
Eupteryx thoulessi	a leafhopper						1			1			11/09	11/09
Eupteryx urticae	a leafhopper						8		5	13			28/08	06/11
Eupteryx vittata	a leafhopper								1	1			02/10	02/10
Hardya melanopsis	a leafhopper						1			1			31/07	31/07
Iassus lanio	a leafhopper								2	2			19/09	02/10
Kybos sp.	a leafhopper								1	1			11/09	11/09
Lindbergina aurovittata	a leafhopper						1			1			06/11	06/11
Macropsis scutellata	a leafhopper								1	1			02/10	02/10
Macrosteles sp.[2]	a leafhopper						1			1			02/10	02/10
Macrosteles variatus	a leafhopper								1	1			26/06	26/06
Mocydia crocea	a leafhopper						1			1			28/08	28/08
Oncopsis carpini	a leafhopper								1			1	19/05	19/05
Oncopsis flavicollis	a leafhopper								1			1	19/05	19/05
Ribautiana debilis	a leafhopper						1			1			11/09	11/09
Ribautiana ulmi	a leafhopper								2	2			25/09	16/10
Sorhoanus xanthoneurus	a leafhopper								2	2			24/07	31/07
Thamnotettix confinis	a leafhopper								2	2			17/04	05/06
Typhlocyba quercus	a leafhopper								1	1			02/10	02/10
Zygina flammigera	a leafhopper						8		4	12			11/09	06/11
Zyginidia scutellaris	a leafhopper						9		10	19			21/08	06/11
Cimicidae														
Anthocoris nemoralis	a flower bug						1		1	1		1	02/04	19/05
Anthocoris nemorum	Common Flower Bug						1		1	2			26/06	17/07
Orius vicinus	a flower bug								1	1			31/07	31/07
Cixiidae														
Cixius nervosus	a lacehopper						1			1			12/06	12/06
Oliarus panzeri	a lacehopper	*N							1	1			17/07	17/07
Tachycixius pilosus	a lacehopper							1	6	5		2	08/05	03/07

Hemiptera (True Bugs) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Delphacidae														
delphacid spp.	a planthopper								1	1			09/10	09/10
Hyledelphax elegantulus	a planthopper						2		2	4			29/05	07/08
Javesella discolor	a planthopper						1		1	2			31/07	07/08
Javesella forcipata	a planthopper								1	1			31/07	31/07
Javesella pellucida	a planthopper								1	1			29/05	29/05
Megamelus notula	a planthopper								1	1			31/07	31/07
Lygaeidae														
Drymus sylvaticus	a ground bug						1		1	2			02/04	22/05
Heterogaster urticae	Nettle Groundbug						4		2	5		1	29/05	11/09
Ischnodemus sabuleti	a ground bug								1	1			11/09	11/09
Kleidocerys resedae	a ground bug						1		4	4		1	02/04	16/10
Trapezonotus arenarius	a ground bug								1	1			22/05	22/05
Miridae														
Amblytylus brevicollis	a plantbug or grassbug	*N					1			1			10/07	10/07
Calocoris norvegicus	a plantbug or grassbug						1		5	6			26/06	24/07
Capsus ater	a plantbug or grassbug						3		2	4		1	12/06	17/07
Harpocera thoracica	a plantbug or grassbug								1			1	19/05	19/05
Heterotoma meriopterum	a plantbug or grassbug						2		2	4			26/06	31/07
Leptopterna dolabrata	a plantbug or grassbug								2	2			26/06	03/07
Liocoris tripustulatus	a plantbug or grassbug						2		6	6		2	15/05	31/07
Lygocoris lucorum	a plantbug or grassbug						1			1			07/08	07/08
Lygus rugulipennis	European Tarnished Plant Bug								1	1			08/05	08/05
Lygus wagneri	a plantbug or grassbug								1	1			02/04	02/04
Miridius quadrivirgatus	a plantbug or grassbug						5		3	8			17/07	14/08
Monalocoris filicis	Bracken Bug								2	2			24/07	11/09
Orthops kalmi	a plantbug or grassbug						1		1			2	19/05	19/05
Orthops viscicola	a plantbug or grassbug								1	1			14/08	14/08
Pantilius tunicatus	a plantbug or grassbug								1	1			19/09	19/09
Phytocoris reuteri	a plantbug or grassbug						1			1			11/09	11/09
Phytocoris tiliae	a plantbug or grassbug								1	1			19/09	19/09
Plagiognathus arbustorum	a plantbug or grassbug						1		1	1		1	24/07	31/07
Stenodema calcaratum	a plantbug or grassbug						3		11	14			02/04	23/10
Stenodema laevigatum	a plantbug or grassbug						8	1	5	11		3	15/05	06/11
Stenotus binotatus	Timothy Grassbug						2		1	3			03/07	24/07
Pentatomidae														
Eysarcoris fabricii	a shield bug						1					1	08/05	08/05
Palomena prasina	a shield bug								5	3		2	03/07	21/08
Pentatoma rufipes	Forest Bug								1			1	31/07	31/07
Troilus luridus	a shield bug						1					1	19/05	19/05
Psyllidae														
Arytaina genistae	a jumping plantlouse						1			1			07/08	07/08
Arytainilla spartiophila	a jumping plantlouse						1			1			24/07	24/07
Psylla crataegi	a jumping plantlouse								2	2			27/03	09/04
Psylla mali	a jumping plantlouse						1			1			10/07	10/07
Psylla melanoneura	a jumping plantlouse						3	2	2	5		2	01/03	06/11
Psylla pulchra	a jumping plantlouse						8		6	14			13/03	22/05
Tingidae														
Tingis ampliata	Creeping Thistle Lacebug						1	1		1		1	19/05	29/05
Tingis cardui	Spear Thistle Lacebug								2			2	19/05	31/07
Triozidae														
Trioza centranthi	a jumping plantlouse						2		3	5			26/06	10/07
Trioza chenopodii	a jumping plantlouse						1			1			19/06	19/06
Trioza remota	a jumping plantlouse						9		13	20		2	28/02	19/06
Trioza urticae	a jumping plantlouse						6		8	14			10/07	06/11
Total Hemiptera species recorded 92							**57**	**5**	**69**	**83**		**22**		
Total records 361							**161**	**6**	**194**	**330**		**31**		

Hymenoptera Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Andrenidae														
Andrena chrysosceles	a bee						1					1	25/05	25/05
Andrena dorsata	a bee						1					1	25/05	25/05
Andrena fulva	Tawny Mining Bee								1			1	08/05	08/05
Andrena haemorrhoa	Early Mining Bee						4			3		1	24/04	22/05
Andrena helvola	a bee								1	1			12/06	12/06
Andrena pubescens	a bee						1			1			05/06	05/06
Andrena scotica	a bee						1			1			15/05	15/05
Andrena semilaevis	a bee						1					1	25/05	25/05
Andrena sp.	a bee						1		1	2			22/05	28/08
Anthophoridae														
Anthophora plumipes	Hairy Footed Flower Bee						1			1			24/04	24/04
Nomada fucata	a bee	*N					1					1	25/05	25/05
Nomada goodeniana	Gooden's Nomad Bee						1					1	08/05	08/05
Nomada panzeri	a bee						1		1	1		1	19/05	22/05
Nomada striata	a bee								2			2	19/05	07/07
Apidae														
Apis mellifera	Honey Bee						2			2			19/03	24/07
Bombus hortorum	Small Garden Bumble Bee								3	2		1	08/05	17/07
Bombus lapidarius	Large Red Tailed Bumble Bee						2		2	4			15/05	05/06
Bombus lucorum	White-tailed Bumble Bee						10		14	23		1	12/04	21/08
Bombus pascuorum	Common Carder Bee						21		26	46		1	17/04	06/11
Bombus pratorum	Early Bumble Bee						6		7	13			17/04	10/07
Bombus terrestris	Buff-tailed Bumble Bee						3		9	12			24/04	07/08
Psithyrus sylvestris	Four Coloured Cuckoo Bee								1	1			01/05	01/05
Psithyrus vestalis	Vestal Cuckoo Bee						1			1			22/05	22/05
Bethylidae														
Bethylus fuscicornis	a bethylid wasp						1			1			11/09	11/09
Braconidae														
Aleiodes borealis	a wasp						1			1			15/05	15/05
Aleiodes coxalis	a wasp								1	1			17/07	17/07
Aleiodes similis	a wasp								1	1			15/05	15/05
Clinocentrus sp.	a wasp								1	1			06/11	06/11
Colastes braconius	a wasp								1	1			15/05	15/05
Dolopsidea indagator	a wasp								2	2			03/07	17/07
Hecabolus sulcatus	a wasp			X					2	2			03/07	17/07
Macrocentrus linearis	a wasp						1			1			11/09	11/09
Charipidae														
Alloxysta brachyptera	a parasitic wasp						1			1			06/11	06/11
Alloxysta brevis	a parasitic wasp						1			1			02/10	02/10
Alloxysta citripes	a parasitic wasp						1			1			06/11	06/11
Alloxysta pleuralis	a parasitic wasp						1			1			02/10	02/10
Alloxysta victrix	a parasitic wasp						1		1	2			21/08	19/09
Chrysididae														
Chrysis angustula	a rubytail wasp						1			1			19/06	19/06
Chrysis cyanea	a rubytail wasp						2		1	3			14/08	21/08
Chrysis ignita	a rubytail wasp						1		2	3			12/06	03/07
Chrysis impressa	a rubytail wasp								1	1			12/06	12/06
Colletidae														
Hylaeus pictipes	solitary bee	*N							1	1			07/08	07/08

Hymenoptera Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Cynipidae														
Diplolepis rosae	Robin's Pin-cushion Gall						1					1	21/05	21/05
Neuroterus quercusbaccarum	Common Spangle Gall							1				1	19/05	19/05
Diapriidae														
Belyta depressa	a small parasitic wasp								1	1			06/11	06/11
Ismarus dorsiger	a small parasitic wasp								1	1			25/09	25/09
Oxylabis bisulca	a small parasitic wasp								1	1			11/09	11/09
Trichopria aequata	a small parasitic wasp						1		1	2			11/09	25/09
Dryinidae														
Aphelopus melaleucus	a small parasitic wasp						1			1			21/08	21/08
Aphelopus sp.	a small parasitic wasp						1			1			28/08	28/08
Euceridae														
Eucera longicornis	a nomad or mason bee	*N							1	1			10/07	10/07
Eucolidae														
Glauraspidia microptera	a small parasitic wasp						1		1	2			05/09	25/09
Trybliographa rapae	a small parasitic wasp						1			1			19/09	19/09
Eumenidae														
Ancistrocerus gazella	a potter wasp or mason wa						1		1	2			19/06	17/07
Ancistrocerus nigricornis	a potter wasp or mason wa								1	1			12/06	12/06
Ancistrocerus trifasciatus	a potter wasp or mason wa						1			1			19/06	19/06
Symmorphus gracilis	a potter wasp or mason wa			X			1			1			24/07	24/07
Eupelmidae														
Macroneura vesicularis	a small parasitic wasp								1	1			21/08	21/08
Figitidae														
Anacharis eucharidiformis	a small parasitic wasp						1		2	3			14/08	28/08
Anacharis eucharioides	a small parasitic wasp						1		2	3			07/08	06/11
Callaspidea defonscolombii	a small parasitic wasp						4			4			09/10	06/11
Xyalaspis petiolata	a small parasitic wasp						1			1			06/11	06/11
Zygosis urticeti	a small parasitic wasp								1	1			09/10	09/10
Formicidae														
Formica fusca	Negro Ant							1	2	2		1	19/05	28/08
Lasius alienus (sl)	an ant							1				1	19/05	19/05
Lasius brunneus	Brown Ant	*N		X			1		3	3		1	08/05	31/07
Lasius flavus	Yellow Meadow Ant						4			3		1	08/05	14/08
Lasius niger (sl)	an ant						6		5	9		2	28/02	06/11
Lasius platythorax	an ant						2		1	2		1	08/05	22/05
Myrmica rubra	Red Ant						1		3	4			24/04	05/09
Myrmica ruginodis	an ant						4		4	7		1	19/05	05/09
Myrmica scabrinodis	an ant						2		1	3			21/08	11/09
Halictidae														
Halictus tumulorum	a solitary bee							1	1	1		1	19/05	07/08
Lasioglossum albipes	a solitary bee						2		3	4		1	19/05	31/07
Lasioglossum calceatum	Slender Mining Bee								1	1			05/06	05/06
Lasioglossum laevigatum	a solitary bee						1		1			2	19/05	25/05
Lasioglossum lativentre	a solitary bee						6		2	7		1	25/05	14/08
Lasioglossum leucopus	a solitary bee						1			1			26/06	26/06
Lasioglossum leucozonium	a solitary bee						1					1	25/05	25/05
Lasioglossum morio	Brassy Mining Bee						1			1			03/07	03/07
Lasioglossum parvulum	a solitary bee								1	1			07/08	07/08
Lasioglossum pauxillum	a solitary bee	*N					2			2			05/06	12/06
Lasioglossum punctatissimu	a solitary bee						1			1			05/06	05/06
Lasioglossum sp.[2]	a solitary bee						1			1			28/08	28/08
Lasioglossum villosulum	Shaggy Mining Bee								1	1			14/08	14/08
Sphecodes monilicornis	a cleptoparasitic bee								1			1	19/05	19/05

APPENDIX C - List of recorded species

Hymenoptera Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Ichneumonidae														
Aclastus eugracilis	an ichneumon						1		1	2			15/05	07/08
Aclastus micator	an ichneumon								1	1			17/07	17/07
Acrodactyla degener	an ichneumon						1			1			07/08	07/08
Alexeter segmentarius	an ichneumon								1	1			17/07	17/07
Apechthis compunctor	an ichneumon						1			1			05/09	05/09
Buathra laborator	an ichneumon								1	1			24/07	24/07
Clistopyga incitator	an ichneumon								2	2			17/07	07/08
Diplazon laetatorius	an ichneumon								2	2			24/07	07/08
Dolichomitus tuberculatus	an ichneumon			X					1	1			23/10	23/10
Enizemum ornatum	an ichneumon								1	1			24/07	24/07
Ephialtes manifestator	an ichneumon			X					2	2			21/08	28/08
Eridolius basalis	an ichneumon								1	1			08/05	08/05
Ichneumon stramentarius se	an ichneumon								1	1			24/07	24/07
Ichneumon suspiciosus	an ichneumon						1					1	28/02	28/02
Isadelphus inimicus	an ichneumon								1	1			03/07	03/07
Itoplectis maculator	an ichneumon						1			1			22/05	22/05
Liotryphon crassisetus	an ichneumon								1	1			23/10	23/10
Megastylus flavopictus	an ichneumon								1	1			22/05	22/05
Mesoleius intermedius	an ichneumon								1	1			03/07	03/07
Micromonodon tener	an ichneumon								1	1			24/07	24/07
Netelia fuscicornis	an ichneumon								1	1			15/05	15/05
Ophion luteus	an ichneumon						2			2			19/03	02/10
Ophion obscurus	an ichneumon						1			1			23/10	23/10
Perilissus variator	an ichneumon						2		1	3			22/05	17/07
Perithous septemcinctorius	an ichneumon						1		1	2			24/07	07/08
Phobetes atomator	an ichneumon						1			1			03/07	03/07
Pimpla contemplator	an ichneumon						5		1	6			19/06	11/09
Pimpla flavicoxis	an ichneumon						1			1			15/05	15/05
Pimpla hypochondriaca	an ichneumon								1	1			11/09	11/09
Poemenia collaris	an ichneumon			X					1	1			07/08	07/08
Promethes sulcator	an ichneumon								2	2			17/07	24/07
Scambus pomorum	an ichneumon								1	1			03/07	03/07
Schizopyga circulator	an ichneumon						1			1			07/08	07/08
Schizopyga frigida	an ichneumon								1	1			22/05	22/05
Sussaba flavipes	an ichneumon						1		2	3			08/05	07/08
Syrphoctonus pallipes	an ichneumon								1	1			07/08	07/08
Syrphoctonus tarsatorius	an ichneumon								1	1			07/08	07/08
Trieces tricarinatus	an ichneumon						1			1			07/08	07/08
Tromatobia lineatoria	an ichneumon						1		1	2			08/05	07/08
Tromatobia oculatoria	an ichneumon						2		2	4			02/10	06/11
Tryphon latrator	an ichneumon								1	1			03/07	03/07
Tryphon sp.	an ichneumon						1			1			16/10	16/10
Tryphon trochanteratus	an ichneumon						1			1			03/07	03/07
Tymmophorus obscuripes	an ichneumon						1		2	3			15/05	07/08
Zaglyptus multicolor	an ichneumon						2			2			11/09	02/10
Zaglyptus varipes	an ichneumon						2		2	4			07/08	06/11
Zatypota bohemani	an ichneumon								1	1			17/07	17/07
Megachilidae														
Chelostoma florisomne	Sleepy Carpenter Bee			X					1			1	19/05	19/05
Megachile willughbiella	Willughby's Leaf-cutter Bee								3	3			19/06	10/07

Hymenoptera Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Mymaridae														
Mymar pulchellum	an egg parasite wasp						3		3	6			21/08	23/10
Mymar regale	an egg parasite wasp								1	1			21/08	21/08
Pompilidae														
Anoplius nigerrimus	a spider-hunting wasp						2		4	4		2	19/06	21/08
Dipogon bifasciatus	a spider-hunting wasp	NR		X					1	1			12/06	12/06
Dipogon subintermedius	a spider-hunting wasp			X			2		3	5			12/06	24/07
Dipogon variegatus	a spider-hunting wasp			X					2	2			07/08	21/08
Priocnemis exaltata	a spider-hunting wasp								1			1	31/07	31/07
Proctotrupidae														
Codrus confusus	a small parasitic wasp						1		1	2			25/09	06/11
Codrus formicarius	a small parasitic wasp						4			4			19/09	06/11
Codrus niger	a small parasitic wasp						1			1			16/10	16/10
Cryptoserphus aculeator	a small parasitic wasp						1		1	2			11/09	02/10
Cryptoserphus laricis	a small parasitic wasp						1			1			06/11	06/11
Phaenoserphus calcar	a small parasitic wasp			X			1		2	3			25/09	06/11
Phaenoserphus fuscipes	a small parasitic wasp						1		1	2			11/09	06/11
Pteromalidae														
Cheiropachus quadrum	a chalcid wasp			X					2	2			19/09	09/10
Plutothrix cisae	a chalcid wasp			X					1	1			11/09	11/09
Sapygidae														
Sapyga clavicornis	a solitary wasp	*N		X					1			1	07/07	07/07
Scelionidae														
Xenomerus ergenna	a small parasitic wasp								1	1			23/10	23/10
Sphecidae														
Crossocerus dimidiatus	Blunt Tailed Digger Wasp			X					1	1			19/06	19/06
Crossocerus elongatulus	Slender Digger Wasp						1		2	3			12/06	07/08
Crossocerus megacephalus	a solitary wasp			X					2	1		1	07/07	31/07
Crossocerus ovalis	a solitary wasp								1	1			12/06	12/06
Crossocerus podagricus	a solitary wasp			X					1	1			12/06	12/06
Crossocerus tarsatus	a solitary wasp								1	1			07/08	07/08
Crosssocerus capitosus	a solitary wasp						1			1			24/07	24/07
Crosssocerus nigritus	a solitary wasp								1	1			17/07	17/07
Ectemnius cephalotes	a solitary wasp			X					2	2			26/06	24/07
Ectemnius lapidarius	a solitary wasp			X					2	1		1	19/06	07/07
Mellinus arvensis	Field Digger Wasp								1	1			14/08	14/08
Passaleocus gracilis	a solitary wasp								1	1			31/07	31/07
Passaloecus corniger	Horned Black Wasp			X					3	3			12/06	07/08
Passaloecus singularis	a solitary wasp			X			1		2	3			26/06	07/08
Pemphredon inornata	a solitary wasp						2			2			24/07	07/08
Pemphredon lugubris	Mournful Wasp			X			1		2	2		1	12/06	24/07
Pemphredon morio	A Digger Wasp	*N		X					1			1	07/07	07/07
Psen bicolor	Two Coloured Mimic Wasp	V					1		2	3			14/08	28/08
Psen dahlbomi	a solitary wasp						1			1			11/09	11/09
Psenulus concolor	a solitary wasp								1	1			12/06	12/06
Psenulus pallipes	Pale Footed Black Wasp						2		5	7			12/06	31/07
Stigmus solskyi	a solitary wasp			X					3	3			26/06	07/08
Trypoxylon attenuatum	Slender Wood Borer Wasp								1	1			31/07	31/07
Trypoxylon clavicerum	Club Horned Wood Borer Wasp						2			2			10/07	24/07
Trypoxylon figulus	Black Wood Borer Wasp								1	1			19/06	19/06
Tenthredinidae														
Aglaostigma acupariae	a sawfly						1		1	2			08/05	15/05

APPENDIX C - List of recorded species

Hymenoptera Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Allantus cinctus	a sawfly								1	1			22/05	22/05
Allantus cingulatus	a sawfly								1	1			29/05	29/05
Allantus rufocinctus	a sawfly						1		1	2			01/05	05/06
Ametastegia carpini	a sawfly								1	1			22/05	22/05
Ametastegia tener	a sawfly						1		3	4			08/05	21/08
Athalia circularis	a sawfly						1		9	10			22/05	17/07
Athalia cordata	a sawfly						8		2	10			08/05	11/09
Athalia liberta	a sawfly						4		2	6			14/08	05/09
Athalia lineolata	a sawfly						1			1			14/08	14/08
Athalia lugens	a sawfly						4		3	7			12/06	28/08
Cladius pectinicornis	a sawfly						1		1	2			01/05	12/06
Dolerus aeneus	a sawfly						2		1	3			01/05	22/05
Dolerus niger	a sawfly						2		1	3			01/05	05/06
Dolerus nigratus	a sawfly						1		2	3			01/05	22/05
Dolerus vestigialis	a sawfly								1	1			22/05	22/05
Empria excisa	a sawfly								1	1			29/05	29/05
Empria liturata	a sawfly								1	1			15/05	15/05
Halidamia affinis	a sawfly						1			1			08/05	08/05
Hoplocampa chrysorrhoea	a sawfly						1			1			08/05	08/05
Hoplocampa testudinea	a sawfly						1					1	19/05	19/05
Monophadnus pallescens	a sawfly								2	2			01/05	08/05
Nematus lucidus	a sawfly						1		1	2			15/05	26/06
Nematus myosotidis	a sawfly						1			1			10/07	10/07
Pachynematus kirbyi	a sawfly						1		3	4			15/05	29/05
Pachynematus obductus	a sawfly								1	1			12/06	12/06
Pachyprotasis rapae	a sawfly						3			3			01/05	29/05
Priophorus morio	a sawfly						1			1			24/07	24/07
Priophorus pilicornis	a sawfly								1	1			24/07	24/07
Pristiphora biscalis	a sawfly								1	1			08/05	08/05
Rhogogaster viridis	a sawfly								2	1		1	19/06	07/07
Stethomostus fuliginosus	a sawfly								1	1			21/08	21/08
Tenthredo arcuata	a sawfly						1		2	1		2	19/05	07/07
Tenthredo celtica	a sawfly								1			1	07/07	07/07
Tenthredo mesomelas	a sawfly								2	1		1	05/06	07/07
Tenthredopsis coquebertii	a sawfly						1			1			12/06	12/06
Tenthredopsis nassata/coqu	a sawfly								1	1			19/06	19/06
Tiphiidae														
Tiphia minuta	The Small Tiphia	*N					2		2	4			12/06	19/06
Vespidae														
Dolichovespula saxonica	a wasp	RDBK					1		4	5			03/07	07/08
Dolichovespula sylvestris	Tree Wasp								4	4			01/05	26/06
Vespa crabro	The Hornet			X					9	4		5	19/05	03/10
Vespula germanica	German Wasp						18		19	37			01/05	06/11
Vespula rufa	Red Wasp						2		1	3			29/05	17/07
Vespula vulgaris	Common Wasp						10		8	18			05/06	06/11
Total Hymenoptera species recorded		**220**		**25**			**125**	**4**	**157**	**200**		**42**		
Total records		**589**					**255**	**4**	**330**	**538**		**51**		

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Alucitidae														
Alucita hexadactyla	Twenty Plume						2		2	2	2		13/04	10/05
Arctiidae														
Eilema complana	Scarce Footman							2	3		5		15/07	07/08
Eilema depressa	Buff Footman							1	1		2		15/07	04/08
Eilema lurideola	Common Footman						1	2	3		6		28/06	07/08
Phragmatobia fuliginosa fuliginosa	Ruby Tiger							2	4	1	5		10/05	07/08
Spilosoma lubricipeda	White Ermine								1		1		25/05	25/05
Spilosoma luteum	Buff Ermine								1		1		25/05	25/05
Tyria jacobaeae	Cinnabar							1	1		2		25/05	28/06
Batrachedridae														
Batrachedra praeangusta	a moth								1		1		19/07	19/07
Blastobasidae														
Blastobasis lignea	a moth							1			1		04/08	04/08
Choreutidae														
Anthophila fabriciana	Nettle Tap						3	1	1	1		4	25/05	11/09
Coleophoridae														
Coleophora mayrella	a moth								1		1		19/07	19/07
Coleophora sp.	a moth								1		1		10/05	10/05
Cossidae														
Zeuzera pyrina	Leopard Moth			X					1		1		15/07	15/07
Drepanidae														
Cilix glaucata	Chinese Character							1			1		25/05	25/05
Drepana falcataria falcataria	Pebble Hook-tip						1	2	4		7		10/05	07/08
Falcaria lacertinaria	Scalloped Hook-tip							1	3		4		25/05	04/08
Watsonalla binaria	Oak Hook-tip								3		3		10/05	19/07
Elachistidae														
Elachista canapennella	a moth						1	2			2	1	10/05	13/05
Elachista rufocinerea	a moth							2				2	15/05	25/05
Eriocraniidae														
Eriocrania subpurpurella	a moth								2	1	1		01/05	10/05
Gelechiidae														
Bryotropha senectella	a moth						1				1		28/06	28/06
Bryotropha terrella	a moth						1		1		2		28/06	19/07
Helcystogramma rufescens	a moth								1		1		19/07	19/07
Metzneria metzneriella	a moth								1		1		15/07	15/07
Pseudotelphusa scalella	a moth							1			1		25/05	25/05
Geometridae														
Abraxas grossulariata	Magpie							2	1		3		04/08	07/08
Aethalura punctulata	Grey Birch						1				1		10/05	10/05
Agriopis marginaria	Dotted Border								1		1		28/03	28/03
Alcis repandata	Mottled Beauty						1	1	2		4		28/06	19/07
Alsophila aescularia	March Moth								1		1		28/03	28/03
Anticlea badiata	Shoulder Stripe								1		1		28/03	28/03
Anticlea derivata	Streamer								2		2		13/04	10/05
Biston betularia	Peppered Moth						1	3	6		10		10/05	07/08
Biston strataria	Oak Beauty								1		1		28/03	28/03
Cabera exanthemata	Common Wave								1		1		04/08	04/08
Cabera pusaria	Common White Wave								2		2		15/07	04/08
Campaea margaritata	Light Emerald						1	1	3		5		28/06	19/07
Camptogramma bilineata	Yellow Shell						4	2	10	8	3	5	12/06	08/09
Chloroclysta citrata	Dark Marbled Carpet							1			1		07/08	07/08
Chloroclysta siterata	Red-green Carpet							1	1		2		10/05	10/05
Chloroclysta truncata	Common Marbled Carpet							2	2		4		25/05	08/09
Chloroclystis v-ata	V-Pug							1	1		2		13/04	15/07

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Cidaria fulvata	Barred Yellow						1		2		2	1	28/06	19/07
Colostygia multistrigaria	Mottled Grey						1				1		13/04	13/04
Colostygia pectinataria	Green Carpet							2	3		5		25/05	08/09
Colotois pennaria	Feathered Thorn						1			1			06/11	06/11
Cosmorhoe ocellata	Purple Bar							1			1		04/08	04/08
Crocallis elinguaria	Scalloped Oak							1	1		2		19/07	04/08
Ecliptopera silaceata	Small Phoenix								1		1		04/08	04/08
Ectropis bistortata	Engrailed								3		3		13/04	19/07
Ennomos alniaria	Canary-shouldered Thorn							2			2		04/08	07/08
Ennomos quercinaria	August Thorn								1		1		04/08	04/08
Epirrhoe alternata alternata	Common Carpet							3	2	1	3	1	25/05	07/08
Eulithis populata	Northern Spinach								2		2		15/07	15/07
Eulithis pyraliata	Barred Straw						1				1		28/06	28/06
Eupithecia abbreviata	Brindled Pug						1	2	4	1	6		28/03	10/05
Eupithecia centaureata	Lime-speck Pug							1	1		2		25/05	07/08
Eupithecia nanata	Narrow-winged Pug								2		2		15/07	15/07
Eupithecia pulchellata pulchellata	Foxglove Pug								3		3		25/05	19/07
Eupithecia pusillata pusillata	Juniper Pug							1			1		07/08	07/08
Eupithecia tantillaria	Dwarf Pug								1		1		25/05	25/05
Geometra papilionaria	Large Emerald								2		2		19/07	04/08
Gymnoscelis rufifasciata	Double-striped Pug								2		2		15/07	04/08
Hemithea aestivaria	Common Emerald								2		2		15/07	19/07
Hydrelia flammeolaria	Small Yellow Wave								1		1		15/07	15/07
Hydriomena ruberata	July Highflyer							1	4		5		15/07	04/08
Idaea aversata	Riband Wave						1	2	4		7		28/06	07/08
Idaea biselata	Small Fan-footed Wave							1	3		4		15/07	04/08
Idaea dimidiata	Single-dotted Wave							2	1		3		15/07	07/08
Idaea fuscovenosa	Dwarf Cream Wave								2		2		15/07	15/07
Idaea trigeminata	Treble Brown Spot							1				1	28/06	28/06
Jodis lactearia	Little Emerald						1					1	30/06	30/06
Ligdia adustata	Scorched Carpet						1				1		28/06	28/06
Lomaspilis marginata	Clouded Border								1		1		19/07	19/07
Lomographa temerata	Clouded Silver						1		1		1	1	12/06	15/07
Menophra abruptaria	Waved Umber							1	1		2		13/04	10/05
Odontopera bidentata	Scalloped Hazel							1	2		3		10/05	25/05
Opisthograptis luteolata	Brimstone						1	5	6		12		10/05	08/09
Ourapteryx sambucaria	Swallow-tailed Moth								2		1	1	30/06	15/07
Paradarisa consonaria	Square Spot								2		2		10/05	25/05
Peribatodes rhomboidaria	Willow Beauty						2	1	3	1	5		28/06	21/08
Perizoma alchemillata	Small Rivulet							1	1		2		15/07	07/08
Petrophora chlorosata	Brown Siver-line						1	2	4	2	4	1	10/05	14/08
Plagodis dolabraria	Scorched Wing								1		1		25/05	25/05
Plagodis pulveraria	Barred Umber							1	1		2		25/05	25/05
Rheumaptera undulata	Scallop Shell							1	2	1	2		19/06	15/07
Scopula floslactata	Cream Wave								2		2		25/05	15/07
Scotopteryx chenopodiata	Shaded Broad-bar						1		2	1	2		15/07	04/08
Selenia dentaria	Early Thorn							1	2		3		13/04	19/07
Selenia tetralunaria	Purple Thorn						1	1	2		4		13/04	04/08
Timandra comae	Blood-vein								2		1	1	25/05	15/07
Xanthorhoe ferrugata	Dark-barred Twin-spot Carpet							1	2		3		25/05	04/08

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Xanthorhoe fluctuata fluctuata	Garden Carpet							1	1		2		19/07	08/09
Xanthorhoe montanata montanata	Silver-ground Carpet						2					2	25/05	28/06
Xanthorhoe spadicearia	Red Twin-spot Carpet								2		2		10/05	25/05
Glyphipterigidae														
Glyphipterix simpliciella	Cocksfoot Moth						1	1	1	2		1	15/05	25/05
Gracillariidae														
Caloptilia elongella	a leaf-minor moth								1		1		15/07	15/07
Caloptilia rufipennella	a leaf-minor moth								1		1		15/07	15/07
Hepialidae														
Hepialus lupulinus	Common Swift						4	1	4	6	3		10/05	14/08
Hepialus sylvina	Orange Swift						2	1	2	3	2		04/08	28/08
Hesperiidae														
Ochlodes faunus	Large Skipper						1		2	2		1	19/06	10/07
Thymelicus sylvestris	Small Skipper								1			1	31/07	31/07
Incurvariidae														
Adela reamurella	Metallic Longhorn							1				1	08/05	08/05
Adela rufimitrella	a longhorn moth								1			1	08/05	08/05
Incurvaria masculella	a longhorn moth						1	1				2	08/05	08/05
Nematopogon swammerdamella	a longhorn moth							1			1		25/05	25/05
Nemophora degeerella	Degeer's Longhorn								1			1	07/07	07/07
Lasiocampidae														
Euthrix potatoria	Drinker								1		1		04/08	04/08
Lycaenidae														
Celastrina argiolus	Holly Blue						1	1				2	24/04	25/05
Lycaena phlaeas	Small Copper								5	3		2	07/07	21/08
Neozephyrus quercus	Purple Hairstreak								1			1	31/07	31/07
Polyommatus icarus	Common Blue						1		2			3	12/06	31/07
Lymantriidae														
Calliteara pudibunda	Pale Tussock								2		2		10/05	25/05
Euproctis similis	Yellow-tail							2	3		5		15/07	07/08
Lymantria monacha	Black Arches								3	1	2		15/07	07/08
Micropterigidae														
Micropterix aureatella	a micro-moth							1				1	25/05	25/05
Micropterix calthella	a micro-moth							1				1	25/05	25/05
Noctuidae														
Abrostola tripartita	Spectacle						2	3	4	2	7		10/05	04/08
Acronicta megacephala	Poplar Grey								2	1	1		12/06	15/07
Acronicta psi/tridens	Dark/Grey Dagger							3	3		6		10/05	07/08
Acronicta rumicis	Knot Grass							3	2		5		10/05	07/08
Agrochola litura	Brown-spot Pinion						1			1			11/09	11/09
Agrotis exclamationis	Heart and Dart						1	3	4	1	7		28/06	07/08
Agrotis puta puta	Shuttle-shaped Dart							3			3		25/05	07/08
Amphipoea oculea	Ear Moth							1	2		3		19/07	04/08
Amphipyra pyramidea	Copper Underwing							2			2		04/08	08/09
Apamea crenata	Clouded-bordered Brindle							1	3	2	2		25/05	12/06
Apamea lithoxylaea	Light Arches						6		7	10	3		26/06	04/08
Apamea monoglypha	Dark Arches						6	3	12	12	8	1	08/05	07/08
Apamea remissa	Dusky Brocade								1	1			19/06	19/06
Apamea scolopacina	Slender Brindle								2		2		19/07	04/08
Apamea sordens	Rustic Shoulder-knot								1		1		25/05	25/05
Aporophyla nigra	Black Rustic							1			1		08/09	08/09
Atethmia centrago	Centre-barred Sallow							1			1		08/09	08/09
Autographa gamma	Silver Y						3	1	4	7	1		29/05	14/08

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Autographa jota	Plain Golden Y						1				1		28/06	28/06
Autographa pulchrina	Beautiful Golden Y							1			1		28/06	28/06
Axylia putris	Flame						2	1	2	1	4		28/06	19/07
Bena bicolorana	Scarce Silver-lines								1		1		04/08	04/08
Cerastis rubricosa	Red Chestnut							1			1		10/05	10/05
Charanyca trigrammica	Treble Lines							1	1		2		25/05	25/05
Colocasia coryli	Nut-tree Tussock							1	2		3		10/05	25/05
Conistra vaccinii	Chestnut							1	2		3		28/03	13/04
Cosmia trapezina	Dun-bar							1	3		4		15/07	04/08
Cryphia domestica	Marbled Beauty							1	1		2		15/07	07/08
Diarsia mendica mendica	Ingrailed Clay								1		1		25/05	25/05
Diarsia rubi	Small Square-spot								1		1		25/05	25/05
Egira conspicillaris	Silver Cloud	*NS							1		1		10/05	10/05
Enargia paleacea	Angle-striped Sallow	*NS							1		1		04/08	04/08
Eugnorisma glareosa	Autumnal Rustic							1			1		08/09	08/09
Euplexia lucipara	Small Angle Shades								1		1		19/07	19/07
Eupsilia transversa	Satellite							1	1		2		28/03	13/04
Hadena bicruris	Lychnis								2	1	1		19/06	19/07
Hoplodrina alsines	Uncertain						1	2	2		5		28/06	04/08
Hoplodrina blanda	Rustic							1	5	1	5		15/07	07/08
Hydraecia micacea	Rosy Rustic							1			1		08/09	08/09
Hypena crassalis	Beautiful Snout								2		2		25/05	19/07
Hypena proboscidalis	Snout						3	1	1		3	2	28/06	19/07
Lacanobia oleracea	Bright-line Brown-eye						1	1	3	1	4		12/06	04/08
Laspeyria flexula	Beautiful Hook-tip								1		1		15/07	15/07
Lithophane ornitopus lactipennis	Grey Shoulder-knot						1	1	2		4		28/03	10/05
Luperina testacea	Flounced Rustic						4		4	8			21/08	11/09
Lycophotia porphyrea	True Lover's Knot							1	3		4		15/07	04/08
Melanchra persicariae	Dot Moth								1		1		15/07	15/07
Mesapamea secalis	Common Rustic						2	2	8	6	6		15/07	14/08
Mesapamea secalis agg.[2]	Common Rustic agg.						2		3	5			14/08	05/09
Mesoligia furuncula	Cloaked Minor						1	2		1	2		04/08	14/08
Mesoligia literosa	Rosy Minor							1			1		04/08	04/08
Mythimna comma	Shoulder-striped Wainscot						1	2			3		25/05	28/06
Mythimna conigera	Brown-line Bright-eye						1		3	1	3		15/07	04/08
Mythimna ferrago	Clay						2	1	1	1	3		28/06	04/08
Mythimna impura	Smoky Wainscot							1	4		5		15/07	04/08
Mythimna pallens	Common Wainscot							3	2	1	4		28/06	08/09
Noctua comes	Lesser Yellow Underwing						1	3	2	1	5		15/07	08/09
Noctua fimbriata	Broad-bordered Yellow Underwing						1	2	2		5		28/06	07/08
Noctua janthe	Lesser Broad-bordered Yellow Underwing							2	2		4		19/07	07/08
Noctua pronuba	Large Yellow Underwing						2	4	10	5	9	2	28/02	11/09
Nycteola revayana	Oak Nycteoline						1				1		10/05	10/05
Ochropleura plecta	Flame Shoulder						2	6	3		11		10/05	08/09
Oligia fasciuncula	Middle-barred Minor								1		1		25/05	25/05
Oligia strigilis	Marbled Minor						1	1	4		6		25/05	19/07
Omphaloscelis lunosa	Lunar Underwing						1	1		1	1		08/09	19/09
Orthosia cerasi	Common Quaker						3	2	3		8		28/03	10/05
Orthosia cruda	Small Quaker						2	2	2		6		28/03	13/04
Orthosia gothica	Hebrew Character						3	3	5	2	9		28/03	10/05
Orthosia gracilis	Powdered Quaker							1			1		13/04	13/04
Orthosia incerta	Clouded Drab						2	1	3		6		28/03	10/05
Orthosia munda	Twin-spotted Quaker						1				1		13/04	13/04
Panemeria tenebrata	Small Yellow Underwing						1					1	19/05	19/05
Panolis flammea	Pine Beauty						1				1		10/05	10/05

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Parascotia fuliginaria	Waved Black	*NS		X					1			1	15/05	15/05
Phlogophora meticulosa	Angle Shades						3		3	5	1		10/05	11/09
Photedes minima	Small Dotted Buff								1		1		19/07	19/07
Protodeltote pygarga	Marbled White Spot						1	1	3	2	3		19/06	15/07
Pseudoips prasinana	Green Silver-lines								1		1		25/05	25/05
Rivula sericealis	Straw Dot						1	1	3		5		28/06	07/08
Rusina ferruginea	Brown Rustic							1			1		28/06	28/06
Scoliopteryx libatrix	Herald								1		1		19/07	19/07
Shargacucullia verbasci	Mullein								1		1		10/05	10/05
Xestia c-nigrum	Setaceous Hebrew Character						1	2			3		28/06	08/09
Xestia triangulum	Double Square-spot							1	3		4		15/07	04/08
Xestia xanthographa	Six-striped Rustic						3	3	4	7	3		04/08	19/09
Xylocampa areola	Early Grey						1	1	3		5		28/03	10/05
Zanclognatha tarsipennalis	Fan-foot							1	1		2		28/06	19/07
Nolidae														
Nola confusalis	Least Black Arches						1		2		3		10/05	25/05
Nola cucullatella	Short-cloaked Moth						1		1		2		28/06	15/07
Notodontidae														
Clostera curtula	Chocolate Tip								1		1		10/05	10/05
Drymonia dodonaea	a moth						2				2		28/03	10/05
Drymonia ruficornis	Marbled Brown						1		3		4		13/04	25/05
Furcula bicuspis	Alder Kitten							1	1		2		10/05	25/05
Furcula furcula	Sallow Kitten							1	1		2		04/08	04/08
Notodonta dromedarius	Iron Prominent							1	2		3		10/05	04/08
Notodonta ziczac	Pebble Prominent							1	2		3		10/05	04/08
Peridea anceps	Great Prominent						1		2		3		10/05	25/05
Phalera bucephala	Buff-tip							1	2		3		25/05	19/07
Pheosia gnoma	Lesser Swallow Prominent						2	2	4		8		13/04	07/08
Pheosia tremula	Swallow Prominent							1			1		04/08	04/08
Pterostoma palpina	Pale Prominent						1	1	2		4		10/05	25/05
Ptilodon capucina	Coxcomb Prominent							1	2		3		28/06	04/08
Nymphalidae														
Aglais urticae	Small Tortoiseshell						1					1	25/06	25/06
Aphantopus hyperantus	Ringlet								5	4		1	10/07	07/08
Argynnis paphia	Silver-washed Fritillary								2			2	10/07	31/07
Inachis io	Peacock								1			1	31/07	31/07
Maniola jurtina	Meadow Brown						3		11	10		4	25/06	28/08
Pararge aegeria	Speckled Wood						2		7	6		3	25/06	19/09
Pyronia tithonus	Gatekeeper						5		5	8		2	25/06	21/08
Oecophoridae														
Agonopterix alstromeriana	a moth								1	1			02/04	02/04
Agonopterix arenella	Burdock Agonopterix						1			1			06/03	06/03
Agonopterix heracliana	a moth						1			1			13/03	13/03
Alabonia geoffrella	a moth			X				1				1	25/05	25/05
Batia lunaris	a moth			X					1		1		15/07	15/07
Batia unitella	a moth			X					1		1		19/07	19/07
Carcina quercana	Oak Longhorned							1	1		2		19/07	04/08
Depressaria pastinacella	Parsnip Moth						1				1		13/04	13/04
Diurnea fagella	a moth						1	2	1		3	1	28/03	13/04
Esperia sulphurella	a moth			X			2		3	2	2	1	01/05	15/05
Pieridae														
Anthocharis cardamines	Orange-Tip						1		1			2	24/04	08/05
Pieris napi	Green-veined White						3		5	5		3	24/04	14/08
Pieris rapae	Small White						1			1			07/08	07/08
Pterophoridae														
Emmelina monodactyla	Common Plume								1		1		19/07	19/07

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Platyptilia pallidactyla	a moth								1		1		15/07	15/07
Stenoptilia pterodactyla	a moth								1		1		15/07	15/07
Pyralidae														
Acentria ephemerella	Water Veneer								1		1		04/08	04/08
Acrobasis consociella	a moth								2		2		15/07	19/07
Agriphila straminella	a moth							2	5	2	5		15/07	21/08
Agriphila tristella	Grass Veneer						3	2	4	6	3		04/08	05/09
Aphomia sociella	Bee Moth								2	1	1		03/07	15/07
Catoptria pinella	a moth								1		1		19/07	19/07
Chrysoteuchia culmella	Garden Grass-veneer						4	4	6	3	8	3	19/06	07/08
Crambus lathionellus	a moth								1		1		15/07	15/07
Crambus pascuella	Grass Pyralid (pascuella)							1	3		3	1	28/06	19/07
Crambus perlella	Grass Pyralid (perlella)							2	2		4		28/06	04/08
Dipleurina lacustrata	a moth							1	2		3		28/06	04/08
Eudonia angustea	a moth							1			1		07/08	07/08
Eudonia mercurella	a moth						1		3		2	2	28/06	04/08
Eurrhypara hortulata	Small Magpie						1	2			2	1	28/06	28/06
Euzophera pinguis	a moth			X				1			1		07/08	07/08
Evergestis pallidata	a moth							1	1		2		19/07	07/08
Hypsopygia costalis	Gold Triangle							2	3		5		15/07	07/08
Myelois circumvoluta	Thistle Ermine						1		1		2		28/06	19/07
Pempelia palumbella	a moth								1		1		15/07	15/07
Perinephela lancealis	a moth								1		1		15/07	15/07
Phlyctaenia coronata	a moth								1		1		15/07	15/07
Phycita roborella	a moth								2		2		15/07	19/07
Pleuroptya ruralis	Mother Of Pearl							2	4		6		15/07	07/08
Pyrausta aurata	Purple Gold						1				1		28/06	28/06
Scoparia ambigualis	a moth						1		1		2		25/05	28/06
Scoparia pyralella	a moth							1			1		28/06	28/06
Trachycera advenella	a moth							1			1		04/08	04/08
Udea lutealis	White Udea							1			1		04/08	04/08
Udea olivalis	a moth						1		2		3		25/05	19/07
Udea prunalis	Grey Udea						1	1	1		3		28/06	04/08
Sphingidae														
Deilephila elpenor	Elephant Hawkmoth						1	1	1	1	2		28/06	31/07
Laothoe populi	Poplar Hawkmoth						1	1	3		5		25/05	04/08
Mimas tiliae	Lime Hawkmoth						1				1		10/05	10/05
Thyatiridae														
Achlya flavicornis	Yellow Horned								1		1		28/03	28/03
Habrosyne pyritoides	Buff Arches						1	1	4		6		28/06	04/08
Polyploca ridens	Frosted Green							1	1		2		13/04	13/04
Thyatira batis	Peach Blossom								3		3		15/07	04/08
Tineidae														
Tinea trinotella	a moth								1			1	28/06	28/06
Tortricidae														
Acleris literana	a moth						2				1	1	10/05	13/05
Agapeta hamana	Lemon Cochylid						1	3	3		6	1	28/06	07/08
Aleimma loeflingiana	a moth								1		1		15/07	15/07
Ancylis badiana	a moth							1				1	25/05	25/05
Apotomis betuletana	Marbled Birch Tortrix								1		1		15/07	15/07
Archips podana	Large Fruit-tree Tortrix						1				1		28/06	28/06
Celypha lacunana	a moth						2	1	2	1	1	3	12/06	19/07
Celypha striana	Brown Barred Marble							1	2		3		28/06	19/07
Clepsis consimilana	a moth								2		1	1	28/06	15/07
Cnephasia incertana	Light Grey Tortrix							1			1		28/06	28/06

Lepidoptera (Butterflies & Moths) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Cnephasia stephensiana	Grey Tortrix							2	1		2	1	28/06	04/08
Cydia pomonella	Codling Moth						1		1		2		28/06	19/07
Cydia splendana	Acorn Tortrix								2		2		15/07	04/08
Ditula angustiorana	a moth								1		1		15/07	15/07
Epagoge grotiana	a moth							1			1		04/08	04/08
Epiblema cynosbatella	a moth								1		1		25/05	25/05
Epiblema roborana	a moth						1				1		28/06	28/06
Epiblema uddmanniana	Bramble Shoot Moth						1	1	1		3		28/06	19/07
Epinotia immundana	a moth						1				1		13/04	13/04
Epinotia tenerana	Nut Bud Moth							1				1	28/06	28/06
Eucosma campoliliana	a moth						1		1		2		28/06	15/07
Eucosma cana	a moth								2		2		15/07	19/07
Eulia ministrana	a moth							2			1	1	25/05	25/05
Gypsonoma dealbana	a moth						1				1		28/06	28/06
Hedya nubiferana	Marbled Orchard Tortrix						1	1	1		2	1	28/06	28/06
Hedya pruniana	Plum Tortrix							3			1	2	15/05	25/05
Lobesia abscisana	a moth								1		1		19/07	19/07
Pandemis corylana	Chequered Fruit-tree Tortrix							1	1		2		04/08	07/08
Pseudargyrotoza conwagana	Yellow-barred Tortrix								1			1	28/06	28/06
Spilonota ocellana	Bud Moth							1			1		04/08	04/08
Syndemis musculana	a moth								1		1		10/05	10/05
Tortrix viridana	Green Oak Tortrix								1		1		15/07	15/07
Yponomeutidae														
Argyresthia bonnetella	a moth								1			1	28/06	28/06
Argyresthia pruniella	Cherry Fruit Moth						1		1		1	1	28/06	28/06
Paraswammerdamia lutarea	a moth						1				1		28/06	28/06
Plutella xylostella	Diamond-back Moth						1	1			2		28/06	04/08
Scythropia crataegella	Hawthorn Moth								1		1		15/07	15/07
Swammerdamia caesiella	a moth						1			1			15/05	15/05
Swammerdamia pyrella	a moth								1		1		04/08	04/08
Yponomeuta malinellus	Apple Ermine								2		2		19/07	04/08
Yponomeuta rorrella	Willow Ermine								1		1		19/07	19/07
Yponomeuta sp.[2]	an ermine moth								2		2		15/07	15/07
Total Lepidoptera species recorded	**321**			**7**			**119**	**160**	**245**	**61**	**277**	**61**		
Total records	**962**						**185**	**239**	**538**	**179**	**690**	**93**		

Collembola (Spring-tails) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Tomoceridae														
Tomocerus longicornis	a spring-tail								1	1			09/10	09/10
Total Collembola species recorded	**1**								**1**	**1**				
Total records	**1**								**1**	**1**				

Dermaptera (Earwigs) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Forficulidae														
Forficula auricularia	Common Earwig				X		28	1	7	33		3	17/04	06/11
Total Dermaptera species recorded	**1**				**1**		**1**	**1**	**1**	**1**		**1**		
Total records	**36**						**28**	**1**	**7**	**33**		**3**		

Neuroptera (Lacewings) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Chrysopidae														
Chrysoperla carnea	a lacewing						3		2	5			27/03	07/08
Chrysoperla carnea agg.[2]	a Lacewing						5		4	8		1	24/04	06/11
Coniopterygidae														
Semidalis aleyrodiformis	a wax fly								1	1			26/06	26/06
Hemerobiidae														
Hemerobius lutescens	a Lacewing						1		1	2			28/08	23/10
Micromus angulatus	a Lacewing						1		3	4			31/07	05/09
Micromus variegatus	a Lacewing								3	3			31/07	02/10
Total Neuroptera species recorded	**5**						**3**		**5**	**5**				
Total records	**24**						**10**		**14**	**23**		**1**		

Odonata Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Coenagriidae														
Pyrrhosoma nymphula	Large Red Damselfly							1				1	19/05	19/05
Libellulidae														
Libellula depressa	Broad-bodied Chaser								1			1	07/07	07/07
Platycnemididae														
Platycnemis pennipes	White-legged Damselfly						1		1	1		1	12/06	17/07
Total Odonata species recorded	**3**						**1**	**1**	**2**	**1**		**3**		
Total records	**4**						**1**	**1**	**2**	**1**		**3**		

Orthoptera (Grasshoppers) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Acrididae														
Chorthippus parallelus	Meadow Grasshopper						1		2	3			26/06	03/07
Total Orthoptera species recorded	**1**						**1**		**1**	**1**				
Total records	**3**						**1**		**2**	**3**				

Plecoptera (Stoneflies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Nemouridae														
Nemurella pictetii	a stonefly								1	1			24/04	24/04
Total Plecoptera species recorded	**1**								**1**	**1**				
Total records	**1**								**1**	**1**				

Psocoptera (Barklice) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Caeciliidae														
Caecilius flavidus	a barklouse						2			2			21/08	11/09
Caecilius sp.	a barklouse						1			1			21/08	21/08
Ectopsocidae														
Ectopsocus briggsi	Bark louse						18		11	29			06/03	06/11
Philotarsidae														
Philotarsus picicornis	a barklouse								1	1			19/09	19/09
Psocidae														
Trichadenotecnum variegatum	a barklouse						2		1	3			14/08	05/09
Stenopsocidae														
Graphopsocus cruciatus	a barklouse						6		4	10			21/08	06/11
Total Psocoptera species recorded	**6**						**5**		**4**	**6**				
Total records	**46**						**29**		**17**	**46**				

Siphonaptera (Fleas) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Pulicidae														
Spilopsyllus cuniculi	Rabbit Flea						1					1	28/02	28/02
Total Siphonaptera species recorded	**1**						**1**					**1**		
Total records	**1**						**1**					**1**		

Strepsiptera (Stylopids) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Elenchidae														
Elenchus tenuicornis	a strepsipteron								1	1			11/09	11/09
Total Strepsiptera species recorded	**1**								**1**	**1**				
Total records	**1**								**1**	**1**				

Trichoptera (Caddisflies) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Hydropsychidae														
Hydropsyche ornatula	a caddisfly						1		1	2			21/08	28/08
Limnephilidae														
Limnephilus marmoratus	a caddisfly								1	1			05/09	05/09
Limnephilus vittatus	a caddisfly								1	1			09/10	09/10
Total Trichoptera species recorded	**3**						**1**		**3**	**3**				
Total records	**4**						**1**		**3**	**4**				

Arachnida (Spiders) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Anyphaenidae														
Anyphaena accentuata	a buzzing spider							1				1	19/05	19/05
Araneidae														
Araneus diadematus	Garden Orb-web Spider						1			1			06/11	06/11
Araneus triguttatus	an orb-weaver spider							1				1	19/05	19/05
Araniella cucurbitina	an orb-weaver spider						1		1	1		1	08/05	05/06
Araniella opisthographa	an orb-weaver spider								1	1			05/06	05/06
Nuctenea umbratica	an orb-weaver spider			X			1					1	28/03	28/03
Clubionidae														
Clubiona brevipes	a foliage spider						2			2			12/06	19/06
Clubiona corticalis	a foliage spider						3		1	4			08/05	17/07
Gnaphosidae														
Scotophaeus blackwalli	a ground spider						2			2			15/05	03/07
Leiobunidae														
Leiobunum rotundum	a harvestman								6	6			17/07	21/08
Linyphiidae														
Bathyphantes gracilis	a money spider						5		5	10			19/03	07/08
Dicymbium nigrum	a money spider								1	1			24/04	24/04
Entelecara congenera	a money spider	*N					1			1			31/07	31/07
Erigone atra	a money spider						7		6	13			19/03	07/08
Erigone dentipalpis	a money spider						2		1	3			19/03	22/05
Gongylidium rufipes	a money spider						1			1			05/06	05/06
Lepthyphantes tenuis	a money spider						12		12	23		1	28/02	07/08
Lepthyphantes zimmermanni	a money spider						1			1			17/07	17/07
Meioneta rurestris	a money spider						2			2			19/03	24/07
Micrargus herbigradus	a money spider								1	1			02/04	02/04
Microneta viaria	a money spider						1			1			02/04	02/04
Oedothorax fuscus	a money spider						2		1	3			27/03	26/06
Porrhomma microphthalmum	a money spider						1			1			19/03	19/03
Walckenaeria nudipalpis	a money spider						1		1	2			02/04	09/04
Lycosidae														
Pardosa palustris	a wolf spider								3	3			22/05	12/06
Trochosa ruricola	a wolf spider						2		1	1		2	19/03	18/05
Phalangiidae														
Phalangium opilio	a harvestman						3		1	4			31/07	28/08
Pisauridae														
Pisaura mirabilis	Tent Spider						1		1	1		1	24/04	10/07
Salticidae														
Heliophanus flavipes	a jumping spider						1			1			22/05	22/05
Salticus scenicus	Zebra Spider						2		1	3			05/06	12/06
Theridiidae														
Anelosimus vittatus	a comb-footed spider						1	1		1		1	19/05	12/06
Enoplognatha ovata	a comb-footed spider						3			3			03/07	24/07
Paidiscura pallens	a comb-footed spider						1		2	3			08/05	05/06
Theridion mystaceum	a comb-footed spider								1	1			08/05	08/05
Theridion tinctum	a comb-footed spider						1			1			12/06	12/06
Thomisidae														
Philodromus aureolus	a running crab spider						3			3			05/06	19/06
Philodromus cespitum	a running crab spider						1			1			03/07	03/07
Philodromus dispar	a running crab spider						1		1	1		1	19/05	22/05
Total Arachnida species recorded		**38**		**1**			**30**	**3**	**20**	**35**		**9**		
Total records		**117**					**66**	**3**	**48**	**107**		**10**		

APPENDIX C - List of recorded species

Chilopoda (Centipedes) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Himantariidae														
Haplophilus subterraneus	a centipede								1	1			27/03	27/03
Lithobiidae														
Lithobius forficatus	a centipede						1					1	19/05	19/05
Lithobius variegatus	a centipede			X					1			1	28/02	28/02
Total Chilopoda species recorded	**3**			**1**			**1**		**2**	**1**		**2**		
Total records	**3**						**1**		**2**	**1**		**2**		

Diplopoda (Millipedes) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Glomeridae														
Glomeris marginata	Pill Millipede								1			1	28/02	28/02
Julidae														
Cylindroiulus punctatus	Blunt-tailed Snake Millipede			X					1			1	28/02	28/02
Nemasomatidae														
Nemasoma varicorne	a millipede			X					1			1	19/05	19/05
Total Diplopoda species recorded	**3**			**2**					**3**			**3**		
Total records	**3**								**3**			**3**		

Isopoda (Woodlice) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Oniscidae														
Oniscus asellus	a woodlouse						5		3	5		3	28/02	06/11
Philosciidae														
Philoscia muscorum	a woodlouse						2		2			4	28/02	19/05
Porcellionidae														
Porcellio scaber	a woodlouse						5		2	3		4	28/02	14/08
Total Isopoda species recorded	**3**						**3**		**3**	**2**		**3**		
Total records	**19**						**12**		**7**	**8**		**11**		

Mollusca (Slugs) Records		Status		Habitat			Orchard			Trap/Sample			Day / Mon	
Family / Species		JNCC 2005	BAP	Saprox.	Dung	Blood	CHE	OLD	FAR	Malaise	Light	Other	First	Last
Arionidae														
Arion ater rufus	Great Black Slug						1					1	28/02	28/02
Arion subfuscus	Dusky Slug								1			1	19/05	19/05
Helicidae														
Helix aspersa	a snail						2					2	08/05	19/05
Trichia hispida	Hairy Snail						1					1	28/02	28/02
Limacidae														
Deroceras reticulatum	Netted Slug						1		1			2	19/05	19/05
Limax maximus	Great Grey Slug								1			1	08/05	08/05
Zonitidae														
Aegopinella nitidula	a snail						1					1	19/05	19/05
Oxychilus alliarius	Garlic Snail								1			1	28/02	28/02
Oxychilus cellarius	a snail						1					1	19/05	19/05
Total Mollusca species recorded	**9**						**6**		**4**			**9**		
Total records	**11**						**7**		**4**			**11**		

APPENDIX D - Vascular Plant Abundance Survey Results

See notes under bottom of table for explanations of column headings and abreviations used

VASCULAR PLANTS				Orchards						
				CHE		OLD		FAR		
Family	Species		Hedge	W	L	W	L	W	L	Status (Day 2001)
Apiaceae	*Angelica sylvestris*	Wild Angelica				R		R		Common
	Anthriscus sylvestris	Cow Parsley		R	O	R		R		Very Common
	Conopodium majus	Pignut		F	A			R		Widespread
	Heracleum sphondylium	Hogweed		R						Very Common
Aquifoliaceae	*Ilex aquifolium*	Holly	*	O		O		O		Very Common
Araliaceae	*Hedera helix*	Ivy	*					R		Very Common
Asteraceae	*Achillea millefolium*	Yarrow		O		R		O		Very Common
	Bellis perennis	Daisy		F	A	O	F	O	F	Very Common
	Centaurea nigra	Common Knapweed		O	F					Very Common
	Cirsium arvense	Creeping Thistle		O	F	O		O	F	Very Common
	Cirsium palustre	Marsh Thistle		R		R		R	O	Common
	Cirsium vulgare	Spear Thistle		R		R				Very Common
	Crepis capillaris	Smooth Hawk's-beard		O				R		Common
	Hypochaeris radicata	Cat's-ear		F		O		O		Very Common
	Leontodon hispidus	Rough Hawkbit		O						Very Common
	Leucanthemum vulgare	Ox-eye Daisy		R						Common
	Pilosella officinarum	Mouse-ear Hawkweed						R	O	Widespread
	Senecio jacobaea	Ragwort		R	O			R		Very Common
	Sonchus asper	Prickly Sow-thistle		R						Very Common
	Taraxacum officinale agg.	Dandelion		O		O		O		Common
Betulaceae	*Alnus glutinosa*	Alder		R						Widespread but Local
	Betula pendula	Silver Birch	*	R				O		Very Common
	Corylus avellana	Hazel	*	O		O		F		Very Common
Brassicaceae	*Cardamine flexuosa*	Wood Bitter-cress						O	F	Common
	Cardamine pratense	Lady's Smock						R	O	Common
Caprifoliaceae	*Lonicera periclymenum*	Honeysuckle	*					O		Common
	Sambucus nigra	Elder	*			R		R		Very Common
Capryophyllaceae	*Lychnis flos-cuculi*	Ragged Robin				R				Widespread but Local
Caryophyllaceae	*Cerastium fontanum*	Common Mouse-ear		O	F	O		O	F	Very Common
	Cerastium glomeratum	Sticky Mouse-ear		R				R		Very Common
	Sagina procumbens	Procumbent Pearlwort						R		Common
	Stellaria graminea	Lesser Stitchwort						R		Common
	Stellaria media	Common Chickweed		R				R		Very Common
Clusiacea	*Hypericum humifusum*	Trailing St John's Wort						R		Uncommon
Cyperaceae	*Carex flacca*	Sedge		R						Widespread
Dryopteridaceae	*Dryopteris filix-mas*	Male fern	*					R		Common
Euphorbiaceae	*Euphorbia amygdaloides*	Wood Spurge	*					R		Widespread but Local
Fabaceae	*Cytisus scoparius*	Broom						R		Widespread
	Lotus cornicutatus	Common Bird'sfoot-trefoil		R				R		Very Common
	Lotus pedunculatus	Greater Bird'sfoot-trefoil				R				Widespread
	Trifolium dubium	Lesser Trefoil						R		Very Common
	Trifolium pratense	Red Clover		O		F		O		Very Common
	Trifolium repens	White Clover		F	A	O		F		Very Common
	Ulex gallii	Western Gorse						R	O	Uncommon
	Vicia cracca	Tufted Vetch						R		Common
	Vicia sativa nigra	Common Vetch				R		R		Widespread but Local
	Vicia sepium	Bush Vetch	*	O		R		R		Common
Fagaceae	*Quercus sp.*	Sessile Oak Hybrid		R		R		O		Widespread but Local
Geraniaceae	*Geranium molle*	Dove's-foot Crane's-bill				R				Common
	Geranium robertianum	Herb Robert	*	R	O			R		Very Common
Juncaceae	*Juncus effusus*	Soft Rush		R						Very Common
	Luzula campestris	Field Woodrush		O	F	O		F	A	Common
Lamiaceae	*Ajuga reptans*	Bugle		O	F	R		R		Widespread
	Glechoma hederacea	Ground Ivy	*	R	O	R				Very Common
	Lamium purpureum	Red Dead-nettle		R						Very Common
	Stachys sylvatica	Hedge Woundwort	*	R				R		Very Common
	Teucrium scorodonia	Wood Sage	*					R		Widespread but Local
Liliaceae	*Hyacinthoides non-scriptus*	Bluebell						R		Common

APPENDIX D - Vascular Plant Abundance Survey Results

See notes under bottom of table for explanations of column headings and abreviations used

VASCULAR PLANTS				Orchards						
				CHE		OLD		FAR		
Family	Species		Hedge	W	L	W	L	W	L	Status (Day 2001)
Oleaceae	*Fraxinus excelsior*	Ash	*	R		O		R		Very Common
Onagraceae	*Chamerion angustifolium*	Rose-bay Willow-herb	*					R		Very Common
Plantaginaceae	*Plantago lanceolata*	Ribwort Plantain		F	A	O		O	F	Very Common
	Plantago major	Greater Plantain		O		O	F			Very Common
Poaceae	*Agrostis capillaris*	Common Bent-grass		F	A	F		F		Very Common
	Alopecurus pratensis	Meadow Fox-tail		F		O	F	O	F	Very Common
	Anthoxanthum odoratum	Sweet Vernal-grass		F	A	O		F	A	Common
	Bromus hordeaceus	Brome		R						Very Common
	Cynosurus cristatus	Crested Dog's-tail		F		F		F		Very Common
	Dactylis glomerata	Cock's-foot		O		O		F	A	Very Common
	Deschampsia caespitosa	Tufted Hair-grass				R				Common
	Festuca rubra	Red Fescue		F		O	F	F		Very Common
	Holcus lanatus	Yorkshire Fog		O		R		O		Very Common
	Holcus mollis	Creeping Soft-grass	*					O		Widespread
	Lolium perenne	Perennial Rye-grass		O	F	F		F	A	Very Common
	Phleum bertolonii	Cat's-tail						R		Widespread
	Phleum pratense	Timothy		O		R		O		Very Common
	Poa annua	Annual Poa		R	O	O		O	F	Very Common
	Poa pratensis	Smooth-stalked Meadow-grass		O		O		F		Very Common
	Poa trivialis	Rough-stalked Meadow-grass		O		O		O		Very Common
Polygonaceae	*Rumex acetosa*	Common Sorrel		O				O	F	Very Common
	Rumex acetosella	Sheep's Sorrel		O				O		Wid
	Rumex obtusifolius	Broad-leaved Dock		R	O			R	O	Very Common
	Rumex sanguineus	Red-veined Dock						R		Very Common
Primulaceae	*Primula veris*	Cowslip		R						Widespread
	Prunella vulgaris	Selfheal		O	F	R		O		Very Common
Ranunculaceae	*Ranunculus acris*	Meadow Buttercup		O		O		O	F	Very Common
	Ranunculus bulbosa	Bulbous Buttercup		F	A	F		F	A	Common
	Ranunculus repens	Creeping Buttercup		R		O		O	F	Very Common
Rosaceae	*Aphanes arvensis*	Parsley Piert						R		Widespread but Local
	Crataegus monogyna	Hawthorn	*	F		A		O		Very Common
	Fragaria vesca	Wild Strawberry						R		Widespread but Local
	Geum urbanum	Herb Bennet	*					R		Very Common
	Potentilla anserina	Silverweed				R				Common
	Potentilla erecta	Tormentil						R		Widespread
	Potentilla sterilis	Barren Strawberry						R		Widespread
	Prunus avium	Wild Cherry	*			R		R		Common
	Prunus domestica	Wild Plum	*	O		O		O		Common
	Prunus spinosa	Blackthorn	*	F		O		O		Very Common
	Rosa arvensis	Field Rose	*	O				R		Common
	Rosa canina agg.	Dog Rose	*	O						Very Common
	Rubus fruticosus agg.	Blackberry	*	R				R		Very Common
Rubiaceae	*Galium aparine*	Cleavers	*	R	O	R		R		Very Common
	Galium saxatile	Heath Bedstraw						R		Uncommon
Salicaceae	*Salix aurita*	Eared Willow	*					R		Rare
	Salix caprea	Goat Willow	*	R				O		Very Common
Scrophulariaceae	*Linaria vulgaris*	Yellow Toadflax						R		Widespread
	Veronica chamaedrys	Gemander Speedwell		O	F			O	F	Very Common
	Veronica officinalis	Heath Speedwell				O		O	F	Widespread but Local
	Veronica serpyllifolia	Thyme-leaved Speedwell		R		O		F	A	Common
Taxaceae	*Taxus baccata*	Yew	*			R				Widespread
Urticaceae	*Urtica dioica*	Stinging Nettle		R		O		R		Very Common
Violaceae	*Viola rivinana*	Common Dog Violet						R		Common
Total species recorded = 111		Species recorded by Orchard		71		54		90		

Based on observations made on 08/05/2004 and 22/05/2004

CHE = Cherry orchard, OLD = Old orchard, FAR = Far Orchard

Hedge = plants found only in hedges not grassland. W = whole stand

Day 2001= Worcs frequency based on recording monads L = local variation in abundance

DAFOR frequency score: D = dominant, A = abundant, F = frequent, O = occasional, R = rare

Appendix E Orchard tree survey tables

Notes on columns: see section 5.2.1 for explanations of column headings and table abbreviations and section 5.1.3 for details of the Vitality Score

Abbreviations not referred to elsewhere:

TRUNK
Lge br – largely broken
Ground – lying on the ground
60dg – leaning at an angle of 60 degrees
St – stump

BRANCH
Rot – rotten
Propd – propped

WOODPECKER HOLE
Nw - new

FUNGI
Bracket – an unidentified bracket fungus
Lg Polypore – a large Polypore bracket fungus.
Honey fungus – *Armillaria mellea*

EPIPHYTES
Yfog – yorkshire fog
Chkw – chickweed

CHERRY ORCHARD

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar t top b bottom	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY CE 1979	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTES F Fork B Base	1979 SURVEY	NOTES
B	11	Cherry	1	x	x	x	F	R wet										On ground	
	12	Cherry	7	6	1.33	6.5			F T	<5C 4B	D	Black Eagle	Few	p	1.6 50 NE		Bramble		
	13	Cherry	10	10	1.36	11.5			>F T	<5C	D	Black Eagle	Few	p					Graft not obvious.
	14	Cherry	9	10	1.71	14			T	4S			Few				Holly F		
C	11	Cherry	3	7	1.26	5	FUP		T		G	Black Eagle						F	Fall onto young tree.
	13	Cherry	6	6	1.55	8		RHtmb	F T	2D		Black Eagle	Few	pp					Graft 2.2m.
	14	Cherry	6	9	1.15	7		Dsk	T			Black Eagle	Few				Holly F		Graft 1.9m.
	18	Cherry	7	8	1.78	8.5		R H		1S 1B		Elton	Few	p					Largest of old trees.
D	6	Cherry	6	6	1.61	6			F healed T	2B 2C	D	Early Rivers	Few				Bramble F	D8 F	Elder at base.
	11	Cherry	5	10	1.43	12			T	D		Black Eagle	Few				Hawkweed F	D9 F	
	13	Cherry	3	10	1.5	6.5		Dsk	?			Elton					Elder F	D10 F	
	14	Cherry	9	6	0.97	7			T	D rot		Napoleon	Few						
	17	Cherry	9	9	1.76	10	Lean L	S Rb	T	4S	D	Elton	Few					D18 poor	?stake mark.
E	11	Cherry	3	10	1.46	6		Dsk R	T		G D	Black Eagle					Rose F	E6 F	
	13	Cherry	4	9	1.19	6		Dsk R	T		D	Black Elton						E7 F	
	14	Cherry	6	6	1.17	6			T			Elton	Few					E9 F	
	16	Cherry	3	x	x	x	F U	R		D	G D	Black Eagle						E12 F	Not in line. Original planting?
	17	Cherry	1	3	1.49	5	B 2.5m	R	T	2B		Eagle			2.0 60 NE			E15 F	Large rotted log near-by.
	18	Cherry	7	9	1.62	9			F T	1C		Smokey Dun	Few				Bramble F		
	19	Cherry	6	5	0.85	3		Dsk	T	2D 2B		Napoleon	Few	p	1.8 45 W				
	20	Cherry	6	6	1.42	5		Dsk H	?			Napoleon	Few	p	2.3 60 NW				Original planting?
F	7	Cherry	7	9	1.51	11			F T			Black Eagle?	Few				Holly F	F6 F	Two massive branches.
	8	Cherry	1	x	x	x	F U	Dsk R		0								F10 F	
	9	Cherry	6	8	1.31	10		S		S L		Black Eagle					Yfog/Chkw	F11 F	Swelling at graft.
	12	Cherry	7	10	1.49	11		S	2F T	S		Black Elton		p				F13 F	Epicormic growth at 1.6-2.0m.
	15	Cherry	7	10	1.41	9.5			F T			Eagle	Few					F14 F	Swollen @ 2m.
	20	Cherry	5	6	1.42	5		Ht	F T	1Br	D	Elton	<100	p	High SE			F18 F	No sign of graft.
	21	Cherry	7	6	1.6	10		Dsk	F T	1Brot	D		Few	p				F19 F	Original?
G	6	Cherry	8	8	1.15	8		S Ht	T	1B		Napoleon	Few						
	8	Cherry	3	9	1.5est	8	F	Dsk											
	9	Cherry	8	10	1.55	9	F					Black Eagle						G11 F	
	15	Cherry	4	9	1.19	7		Dsk				Elton						G14 poor	
	16	Cherry	7	10	1.77	10				1B		Elton?	Few	p	1.7 60 SE				2m off line. Malaise Trap.
	17	Cherry	7	10	1.7	9.5						Elton?	Few	p					Old plant
	19	Apple	9	6	1.04	8		S		S		Charles Ross	Good	p					
H	6	Cherry	7	4.5	1.02	4		S Rt	T	1B		Napoleon							One live branch.
	7	Cherry	1	x	x	x	F B 0.5m	St Rb		0	G	Black Eagle?		p					Log on ground, wet.
	8	Cherry	6	8	1.12	5		S Rt	T				Few						
	9	Cherry	7	10	1.64	11		S	T	S		Black Eagle?	Few				Elder F		Small graft died early.
	10	Cherry	6	10	1.64	5.5		S Rt		3C		Black Eagle?	?			Bracket			One main branch, growth from cuts.
	11	Cherry	7	10	1.45	12		S	T	1B		BradbourneBl	Few				Holly+Bramble		Full canopy.
	13	Cherry	1	x	x	x	F U	R				Oliver?						H14 F	Wet log.
	15	Cherry	7	9	1.45	9		S Rt	F T	S		Elton?	Few						Good canopy. Epicormic growth.

CHERRY ORCHARD

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar t top b bottom	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY CE 1979	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTES F Fork B Base	1979 SURVEY	NOTES
H	16	Cherry	7	9	1.2	9		S Rt	T	1B		Elton?	Few						Large lateral branch soon to split.
	17	Cherry	8	8	1.02	8.5		S	?	2B rot		Eagle	Few						Leaves all over canopy.
	18	Cherry	8	8	1.46	9		Dsk Rt		1B		Elton?	Few						Original? Trunk distorted.
	21	Apple	7	6	0.9	5	L	S R	F	1Bpropd		Worcs Perm	fair	p		Inonotus hispidus			Swollen base. Graft at 3m.
J	7	Cherry	5	9	1.44	9			F tb T	1C		Napoleon	Few				Holly 0.3m		Deep fissure in heartwood.
	9	Cherry	5	9	1.47	9		S	T	S 1D		Black Eagle					Elder 0.15m		
	10	Cherry	2	5	1.24	3		Dsk tmb	T	3B	G	Black Eagle							Heart rotten full length.
	11	Cherry	8	10	1.48	10		S	T	S 1D		Black Eagle	Few				Holly 0.6m		Hawthorn and grass also in fork.
	13	Cherry	7	6	1.25	6		S Rb	T	3 D B	G D	Oliver						J14 F	Large leaves below.
	15	Cherry	7	8	1.36	7			Fdeep T		D	Elton	Few						
	16	Cherry	9	10	1.34	8		SRt	T	D		Early Rivers?	Few						3 main branches to full ht.
	17	Cherry	3	x	1.12	x	F B prop	S R		4 D		B&W grafts							Trunk broken at ground. Dry.
	19	Cherry	4	x	1.45	x		Sb Rt	F	2B		Mazzard	Few	p					Original? Fungus in cracks.
	20	Cherry	10	10	1.37	11		S		S		Oliver	<100	p					Original?
K	7	Cherry	1	x	x	x	F wet	R		0		Oliver		p					Overgrown with bramble.
	9	Cherry	2	x	x	x	F U dry	R						p				K8 F	Root partly attached.
	11	Cherry	2	x	x	x	F wet	St Rb				Black Eagle		p				K10 F	Broken at ground.
	13	Cherry	7	9	1.07	8		S	T				Few						
	14	Cherry	5	8	1.52	10		DskRtmb	T		D	Elton?	Few						One live branch.
	15	Cherry	9	10	1.34	10		S	F small T	1rotten		Elton?	Few						Graft 2.4m.
	16	Cherry	7	10	1.23	9		Rt	F T	1B >1C		Early Rivers?	Few					K17 F	Wire round base.
	21	Cherry	4	7	1.32	10		S dsk	T		D	Oliver	Few						Original?
L	11	Cherry	3	10	1.24	x	F U	Dsk	?	4D		Black Eagle		p				L8 F	Original?
	14	Cherry	3	7	0.93	5		Dsk	?	2D	D	Oliver						L9 poor	
	15	Cherry	7	9	1.27	10		S	T			Oliver	Few					L10 F	4 live branches.
	16	Cherry	8	9	1.14	9.5		S	F healed T			Oliver	Few						
	17	Cherry	6	9	1.08	8		S Dsk	T			Oliver	Few						Original?
	18	Cherry	8	10	1.76	13		Sb H Rt	?	1B		Oliver	Few						Large branch breakout. Hollow above 1.0m.
	20	Cherry	9	10	1.59	13.5		S	T			?Oliv/BradBl	Few	p			Holly 0.9m	L21 F	
M	9	Cherry	3	x	1.34	10		Dsk Rt	S ?	1B	S	Black Eagle		p					
	10	Cherry	8	5	0.81	5	L U	Rt				Black Eagle	Few	p		Honey fungus			Single main branch.
	11	Cherry	3	8	1.38	7		Dsk	T		G	Black Eagle		p		Ganoderma sp.			?graft at 0.3m. Epicormic stock growth at base.
	13	Cherry	7	9	1.69	14.5	F lge br	S	T	2B propped		Oliver	<12				Holly 0.5m		
	14	Cherry	7	10	1.6	10.5		S	T	1B		Oliver	Few						Large epicormic growth 7-.9m.
	15	Cherry	9	11	1.46	12		S	3F T			Oliver	Good						Leader to full ht. Epicormic growth 1.8-2.5m.
N	8	Cherry	1	x	x	x	B	St R		0		Oliver							

Total 454 **Tree Count 79** **Average Vitality 5.75**

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped w,sw,e,ne west etc.	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	NOTES
A	3	Pear	10	13	1.48	8		S	F T				2	P			Strong leader, some new growth.
	6	Pear	9	10	1.18	7	L	S	F	2B 2C			2				Strong leader, some new growth.
	11	Pear	7	8.5	1.14	7		S	F T		G		0		Scars		Strong leader, some new growth.
B	5	Pear	6	6	1.25	4		S	T	3D							
	6	Pear	9	10	1.45	9		S	T								Large yellow/green fruit. Heavy russet all over.
	7	Pear	10	8	1.34	8		S	T				<5	P			Ditto less russet.
	8	Apple	7	6	0.78	5		S	F			King of the Pippi	Good	P	1.55 40 NE	Brackets N	
	12	Pear	9	12	1.19	6.5		S					<5	P			Mole hills round root area.
C	5	Pear	10	12	1.69	9		S	T				<5				Drey or nest high up.
	11	Pear	9	8	1.25	8.5		S	F T	1C		small brown	Good	P	2.5 35 SE	Diseased leaves	Woodpecker hole also 1.8m SE. Fruit as J9 J10.
	12	Pear	8	8	1.01	3.5		S	F T	2D			<5	P			New shoots from top trunk.Fruit green mottled.
	13	Pear	10	11	1.51	10.5		S	F T	1C			0				Largest tree.
D	2	Pear	6	7	1.24	6		S	2F T				<20		Scars		Fruit as row B.
	3	Pear	7	10	1.47	7		S	F T	D+L			<12	P			Fruit large. As row B on new growth.
	8	Pear	8	10	1.29	7.5		S	T				1		Scars		Fruit green mottled hint of pink flush.
	9	Pear	9	12	1.64	9	Lsw	S			G .3-1m	large pink	Good	P			Large fruits yellowish, pink flush. Tallest tree.
	10	Pear	6	4.5	0.725	2		Rb		B+4D	S 1m		0		Scars		
	11	Pear	6	6	0.74	2	L	St		1D			0				
E	5	Pear	6	8	1.175	6	Lsw		2F				1				Dead upper, new growth below.
	8	Pear	7	?	?	?		S	T				0		Scars		
	9	Pear	7	7	0.85	5		S	T				0				
F	7=9	Pear	8	8	0.99	6		S	F T				0				Numbering confused. Mass of new shoots.
	10	Pear	9	8	1.1	8.5		S					0				Numbering confused. Mass of new shoots.
	11	Pear	7	7	0.9	5		S	F				0		Scars		Very little new growth.
	12	Apple	6	5	0.6	5	L e			1B			0				
G	3	Apple	8	4	1.18	5.5		Rt		1D 1B			1				Trunk twisted clockwise.
	4	Pear	7	10	1.44	7		S		D			0				
	8	Pear	5	8	1.21	5			T	B	Gwest		0				Suckers from stock.
H	4	Pear	5	7	x	7	B ground	H	S	3D			0				Grafted 1.3m?
	6	Pear	3	1.25	0.9	x	B ground	St R		2D rot	G		0				Trunk broken at 1.2m.
	9	Apple	7	6	0.7	6		S Rt	F	1B		Worcester Permain	Med	P			

OLD ORCHARD

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped w,sw,e,ne west etc.	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	NOTES
J	4	P ? A	7	5.5	0.64	3		S	F				0		Scars		
	5	Apple	7	6	0.79	8	L se	S	2F	2B			0		Scars		
	9	Pear	9	7.5	1.515	7.5		S				small sweet	Good	P			Small round brown fruit.
	10	Pear	9	8.5	1.72	7	L ne	S		1R		small sweet	Good		1.7 small nw		Grafted 1.6m trunk .4m diam.
M	1	Apple	5	6	1.19	4		H R							1.7 45 s		
	2	Apple	7	4	1.24	5		H R		2B		Lady's Finger of Hereford	Med	P		Inonotus hispidus	Grafted 0.4m Frt on 3 new brs.
	3	Apple	7	5.5	1	4.5		H m+t				Rival	Med				Grafted 0.2m. Suckers.
	4	Apple	9	7	1.4	10	Lw	S R	F			Newton Wonder	Med	P			Deep split full length and into branch.
	Total		277			Tree Cou	37		Average Vitality	7.486486							

FAR ORCHARD

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped gl ground level ra root . attached	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTE F Fork B Base	NOTES
A	8	Damson	8	6.0	0.80	6.5	L	S		1C 1B 2D	.9G	Salop Prune	Few					
	14	Damson	8	4.5	0.52	5.5				1B	1.5G	Salop Prune				Russsula sp		
B	13	Damson	7	5.0	0.62	6.0				2D	1.0G	Salop Prune						
	15	Damson	7	5.0	0.63	6.0				2D		Salop Prune	Med					
	19	Damson	7	6.0	0.63	5.0				1B 1C	1.0G	Salop Prune						
	21	Damson	7	5.5	0.55	5.0	L			1B		Salop Prune						
	23	Damson	6	4.5	0.61	4.5			2F	1C 1B 3D		Salop Prune						
	25	Damson	7	4.5	0.57	5.0				1B 1D			Good					
C	10	Damson	6	5.5	0.64	2.5				1C 1B	.75G	Salop Prune						
	12	Damson	7	5.5	0.62	3.5	L			1B		Salop Prune						
	16	Damson	7	6.0	0.63	7.0				1D		Salop Prune	Few			Parasol		
	18	Damson	3	0.0	0.55	0.0	wet log				G	Salop Prune						
	22	Damson	7	5.2	0.53	4.5				2D 1C	1.0 G	Salop Prune	Few		small holes			
	27	Damson	7	4.0	0.40	2.5				1D 1B		Salop Prune	Good					
D	7	Apple	8	7.5	0.77	4.5	L			1B 1D	G	Belle de Pontoise	Good					
	11	Apple	8	6.0	0.67	4.0	L			1B 1D		?	Good					
	17	Apple	7	7.0	0.86	7.0				1D		Rival	Good					
	21	Apple	8	4.5	0.59	5.0				1D		Rival	Good					
	28	Cherry	3	4.0	0.58	2.5		R		4D	G D							
E	4	Cherry	6	10.0	1.36	11.0				some D	some G							
	6	Cherry	6	11.0	1.34	10.0												
	8	Cherry	6	10.0	1.30	8.0											Rowan	
	12	Cherry	1	0.0	0.00	0.0	F B/gl			1D								
	14	Cherry	1	2.2	0.57	0.0		St Htmb		none	G							
	18	Cherry	6	8.0	1.12	7.0		S Rt							4 W	Daedaleopsis confragosa		LS Woodpecker bred
	20	Cherry	2	8.0	1.13	3.5		Dsk		2D	G D							
	22	Cherry	1	0.0	0.00	0.0		Dsk										
	26	Cherry	6	9.0	1.18	5.0				4B								

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped gl ground level ra root . attached	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTE F Fork B Base	NOTES
F	3	Cherry	6	10.0	1.08	7.0		Dsk	T	1B								
	5	Cherry	6	7.5	1.00	6.0				1D								
	7	Cherry	6	8.0	0.90	6.5												
	9	Cherry	5	8.0	0.82	5.0		Dsk		4D	Intact			1.6 55 S				
	11	Cherry	6	7.0	0.82	6.5		Dsk			Intact							
	13	Cherry	5	6.0	0.85	6.0		Dsk	F	4D								
	19	Cherry	5	9.0	0.86	6.0				1D								
	21	Cherry	3	4.0	0.76	2.0				3B				1.8 50 W	?Honey fungus			
	25	Cherry	3	9.0	0.67	2.0		Dsk			Intact							
	27	Cherry	7	9.0	0.69	6.0				1D								
	29	Cherry	2	6.0	0.75	4.0		Dsk		7D	G							Redstart nest
G	4	Cherry	3	6.0	0.66	3.0		Dsk	T	3D	Intact							
	6	Cherry	3	6.0	0.69	4.0		St Ht			S			2				
	8	Cherry	3	4.0	0.76	4.0		Htmb	F	1B	S					2 year Oak		
	10	Cherry	7	5.0	0.82	5.0				1B				1.8 60 N				GS Woodpecker bred
	12	Cherry	2	4.0	0.55	1.5		St			G							
	14	Cherry	3	8.0	0.87	3.0		Dsk			D intact							
	16	Cherry	5	5.0	0.80	7.0		Dsk			intact							
	18	Cherry	2	4.0	0.55	2.0		Dsk			intact							
	22	Cherry	5	8.0	0.88	4.5		Dsk		1B				trial hole				
	24	Cherry	6	7.0	0.93	6.0		Ht		1B	intact				3 brackets			
	26	Cherry	2	6.0	0.69	4.0		Dsk R			G				Honey fung?			
	30	Cherry	2	6.0	0.89	3.0		R		1B	G			1.72 55				
H	1	Cherry	6	6.0	1.27	5.0		S ?H	F	1B				?				
	5	Cherry	5	5.5	0.91	5.0		Dsk Ht	F T									
	7	Cherry	4	6.0	1.07	5.0		S	F	6D 1B					12 brackets high			
	9	Cherry	4	5.5	0.79	4.0			F	5D				1.5 45				
	11	Cherry	6	7.0	0.79	5.0			F					2.0 60				
	13	Cherry	3	6.0	1.18	6.0		Dsk	F	2B	D							
	15	Cherry	3	5.0	1.08	0.5		Dsk		2B	intact			1.7 45				
	17	Cherry	9	8.0	0.79	6.0			F					1.9 55 W				
	19	Cherry	1	x	x	x	F log			0								
	21	Cherry	5	6.0	0.93	3.0		S Rb		3B								
	25	Cherry	6	8.0	0.61	4.5				all sound								
	27	Cherry	1	0.9	0.66	0.0	F	St R		0								

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped gl ground level ra root . attached	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTE F Fork B Base	NOTES
J	2	Cherry	1	1.8	1.03	0.0		St Ht	T		intact					Ganoderma sp.		
	4	Cherry	9	8.0	0.97	7.5				intact								
	6	Cherry	7	10.0	1.04	6.0				1D								
	8	Cherry	7	10.0	1.14	8.0				1D	S							
	10	Cherry	8	10.0	1.16	9.0			T	1B							Rowan	
	12	Cherry	1					R										
	14	Cherry	1	4.0	0.90	1.0		St H		1B	S			2.0 60 W		Honey fungus?		
	16	Cherry	8	6.5	0.77	6.0												
	18	Cherry	7	5.5	0.62	4.0		S										
	20	Cherry	4	6.0	0.79	5.5		H		1D								
	22	Cherry	3	7.0	0.84	4.5		Dsk	F		D intact							
	24	Cherry	7	8.0	0.95	7.0			T									
	26	Cherry	6	4.5	0.33	2.5												
	28	Cherry	3	3.5	0.99	2.0		H	F T	B								
K	7	Cherry	6	6.0	0.92	6.0		S H						1.8 60 SW				
	9	Cherry	6	5.0	1.07	2.0			T	2B 1D								
	11	Cherry	2	4.0	0.71	1.5		Dsk R H	F		G							
	13	Cherry	5	8.0	1.00	6.5			F T					50 NW				
	14	Cherry	1	x	x	x												
	15	Cherry	1	x	x	x												
	17	Cherry	6	8.0	1.14	4.0		R tmb	F T					2.0 50			Holly	
	19	Cherry	6	6.0	0.68	3.0								1.8 65				
	21	Cherry	0	x	x	x												
	23	Cherry	2	3.0	0.82	1.5		St	F					1.9 60 S				
	25	Cherry	1	1.0	0.70	0.0		St RH		D	G					?Honey fungus		
	27	Cherry	7	8.0	1.30	10.0			T								Holly in fork	

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped gl ground level ra root . attached	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTE F Fork B Base	NOTES
L	6	Damson	6	3.0	0.59	2.0				2D B		Salop Prune	Few		1.9 30 W	brackets		
	8	Cherry	6	8.0	0.96	7.0				4D								
	10	Cherry	3	6.0	0.70	2.0		Dsk		3D								
	14	Cherry	5	7.5	1.18	8.0		H	F	4D					2.3 70 SW	Ganoderma sp.		
	16	Cherry	2	5.0	0.72	3.0		St R			G							
	18	Cherry	3	8.0	1.00	5.0		Dsk		5D	G							
	20	Cherry	1	1.9	0.62	0.0		St R		0	G							
	22	Cherry	6	9.0	1.33	7.0		H	F	5D 1B					2.2 75 E			
	24	Cherry	6	8.0	1.04	7.5									1.9 30 N		Ivy	
M	5	Apple	10	7.5	1.17	10.0	L 60dg	S Rm	F	4L		Annie Elizabeth	Good					
	7	Apple	9	8.0	1.15	9.0				4L		Annie Elizabeth	Med					
	9	Apple	9	8.0	1.18	10.0				4L	some G	Annie Elizabeth	Poor					
	11	Apple	10	8.0	1.25	10.5				4L		Annie Elizabeth	Good					
	15	Apple	10	7.5	1.07	9.5				3L		Annie Elizabeth	Good				Poa annua	
	17	Apple	9	7.0	0.85	7.0				3L		Annie Elizabeth	Poor					
	19	Apple	9	8.0	1.16	8.0	L 50 degrees	Rt	F	4S 1C		Annie Elizabeth	Good					
	21	Apple	3	8.5	0.77	6.0		Dsk		3D 1B								
	23	Apple	3	6.0	0.66	5.0		Dsk R		4D	D							
	25	Cherry	6	7.0	1.05	8.0		S		1B 2L					1.7 30 N			
N	12	Apple	2	3.7	0.48	1.0		St		2D	G							
	14	A?D	2	4.0	0.47	1.0		St		B					small holes			
	24	Cherry	7	7.0	1.01	6.5				1D 2L					1.8 50			
P	5	Apple	7	6.0	1.15	7.5	L	H	F	3L	intact	Annie Elizabeth	Few		1.5 60 S			
	9	Apple	7	8.0	1.20	8.0	L			1C 3L		Annie Elizabeth	Few		Trial in cut			
	11	Apple	1					R H	F	2D	intact							
	13	Apple	2	4.0	0.90	5.5	F U				G	Annie Elizabeth						
	15	Apple	6	7.0	1.18	9.0	L			1B D C	Intact G	Annie Elizabeth			2.3 60 SW			
	17	Apple	2	7.0	1.09	6.0	F U	H		B	G	Annie Elizabeth						
	19	Apple	5	8.0	1.21	7.0	L	Dsk		3C B	G	Annie Elizabeth			1.6 60 E			
	21	Apple	7	8.0	1.09	8.0	L	S R	F	2L		Annie Elizabeth	Med					
	23	Apple	6	5.5	1.26	6.0	Fra			D C B		Annie Elizabeth	Med			Honey fungus?	Moss	

FAR ORCHARD

ROW	TREE	SPECIES	VITALITY	HEIGHT (m)	Girth (m)	SPREAD (m)	TRUNK: F Fallen L Leaning B Broken U Uprooted P Propped gl ground level ra root . attached	TRUNK: S Sound R Rotten H Hollow St Stump Dsk Skeleton t,m,b top,mid,bot	TRUNK: F Fissure S Split T Tar	BRANCH: B Broken C Cut D Dead L Live	BARK: D Det-ached S split G Off	FRUIT VARIETY	CROPS	PHOTO TAKEN (p)	WOOD-PECKER HOLES Height (m) Width (mm) Direction	FUNGI	EPIPHYTE F Fork B Base	NOTES
Q	12	A?D	2	3.5	0.34	2.0		R		3D	G	?						
	14	A?D	2	3.0	0.48	1.0		R		3D		?						
	18	Apple	1	x	x	x	F			1D								
R	5	Apple	7	6.0	0.99	7.0	L		3F	3L		Annie Elizabetl	Med					
	7	Apple	7	7.0	1.12	7.5	L	Rtm	F	B D	G		Med			Inonotus hispidus	Cocksfoot	
	11	Apple	3	6.0	1.17	6.0	F U			3D	G							
	13	Apple	3	6.0	0.33	5.0	F U	R	F	D	G							
	15	Apple	7	6.0	1.11	9.0		S Rm	2F	1C			Poor			bracket		
	17	Apple	7	8.0	1.18	8.5	L			1C			Med					
	19	Apple	7	8.0	1.28	10.0	L			2L 2D			Med					
	21	Apple	6	8.0	1.31	10.0				2B 1D	G		Few			Lg Polypore		
S	16	Damson	1	2.0	0.35	0.2		St R			G	?damson			1.55 45 SE			
T	11	Apple	7	8.0	1.15	7.5	L		3F	1C 1D								
	13	Apple	7	8.5	1.22	10.0	L		F	1B	D							
	15	Apple	7	5.0	0.84	6.5	L		2F	1C 1D			24		1.6 30	bracket		
	17	Apple	6	6.0	1.11	6.0	F U	Massive		2D	D		Few					
U	9	Apple	7	7.5	1.26	7.0	F U			1C			Few					
	11	Apple	7	9.0	1.30	10.0	L		F				Few		1.0 50 S			
	15	Apple	8	7.0	0.95	6.0	L	S R	F			Bramley	Med					
V	9	Apple	6	7.0	1.10	7.0	F U			D			50					
	11	Apple	7	7.0	1.16	7.5	L	R	3F	1C			Few					
	15	Apple	6	8.0	1.21	9.0				1D			50			Inonotus hispidus		
	17	Apple	7	7.0	1.09	6.0			2F	2C 1D			Few		2.0 50 E	Inonotus hispidus		
W	10	Damson	1	4.5	0.46	0.0	R log					? damson						
X	10	Damson	1	3.5	0.37	1.0	St	St H	F		D				Scars	Honey Fungus		
	Total		**728**		**Tree Count**		**144**		**Average Vitality**	**5.06**								

Appendix F Location map and historical maps

Map F1: Location of Bowcastle Farm Orchards

Map F2: Tithe map of Bewdley 1845

Map F3: Crown Sale map of Bowcastle Farm 1870

Map F4: Ordnance Survey map of Bowcastle Farm area 1883

Map F5: Ordnance Survey map of Bowcastle Farm 1901

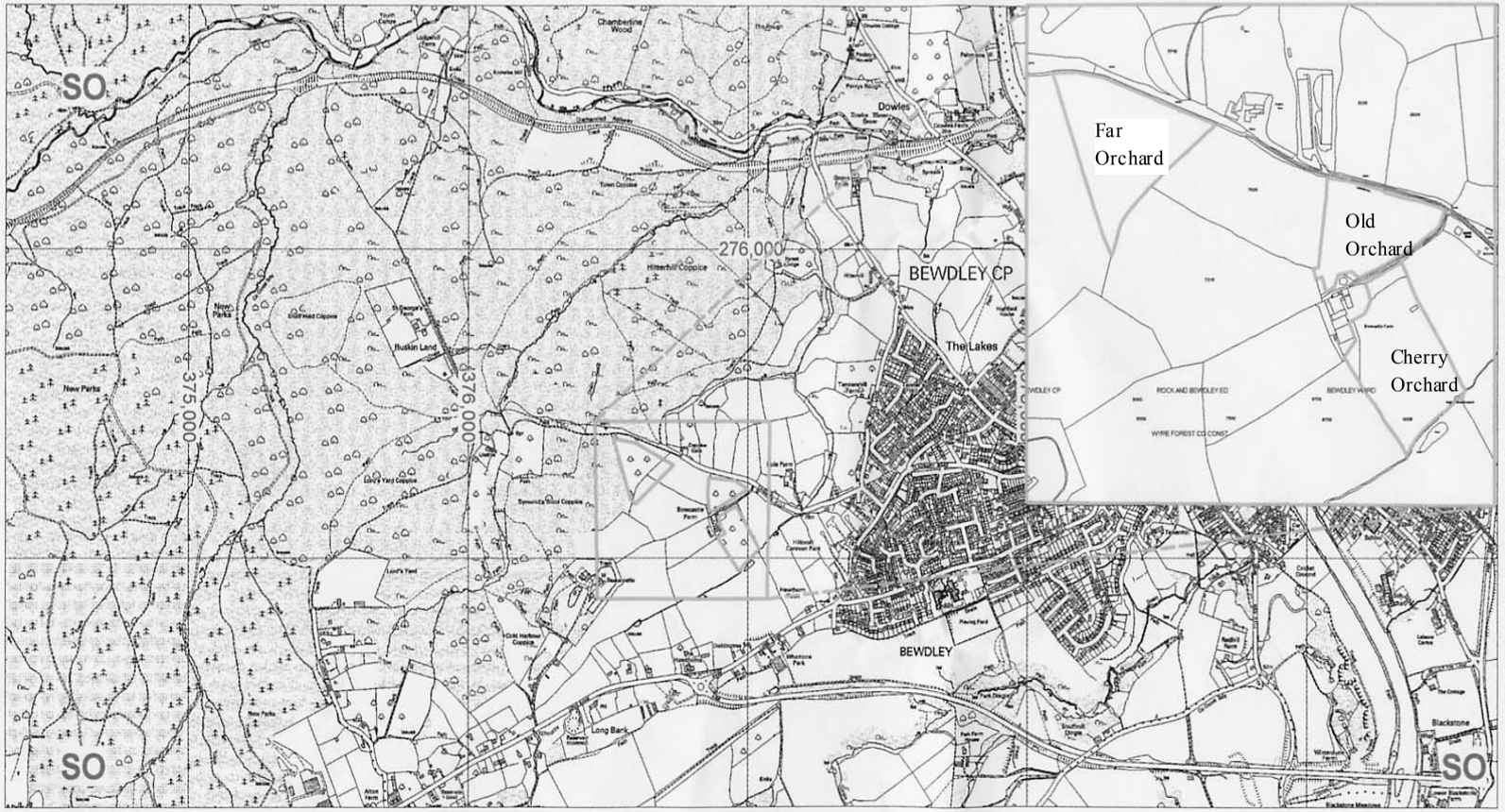
Map F6: Ordnance Survey map of Bowcastle Farm 1925

Appendix F: Map F1

ENGLISH NATURE

Wyre Forest Orchard Survey

Location Map



Bowcastle Farm
Tanners Hill
Bewdley
Worcestershire
DY12 2LN

Scale 1:20000 Map 1 of 1

0 400 800 1200m

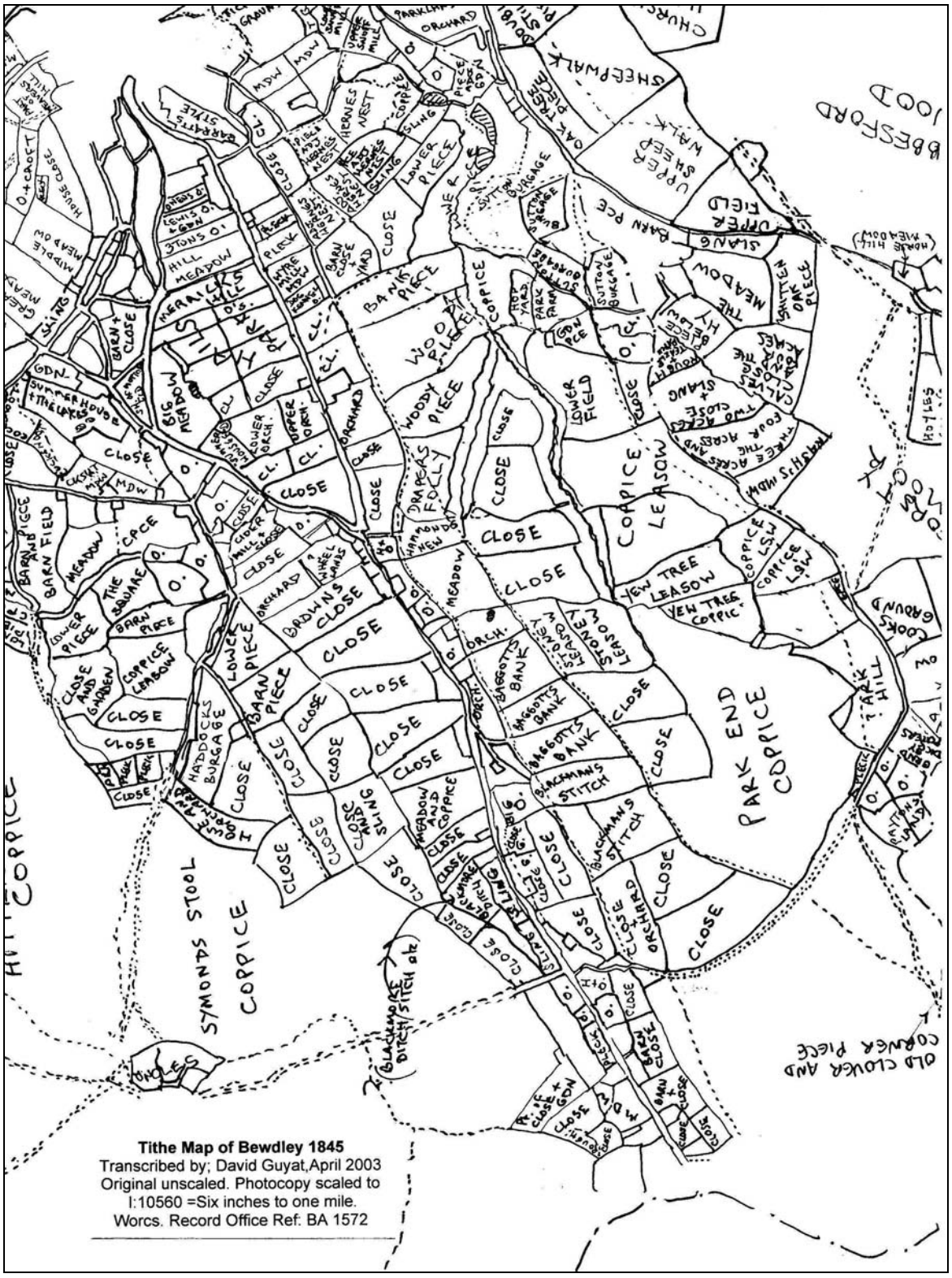
0 1000 2000 3000ft.

Drawn By: Poppy Baskeyfield
Date: 1/12/2003
Ref: so7701375493

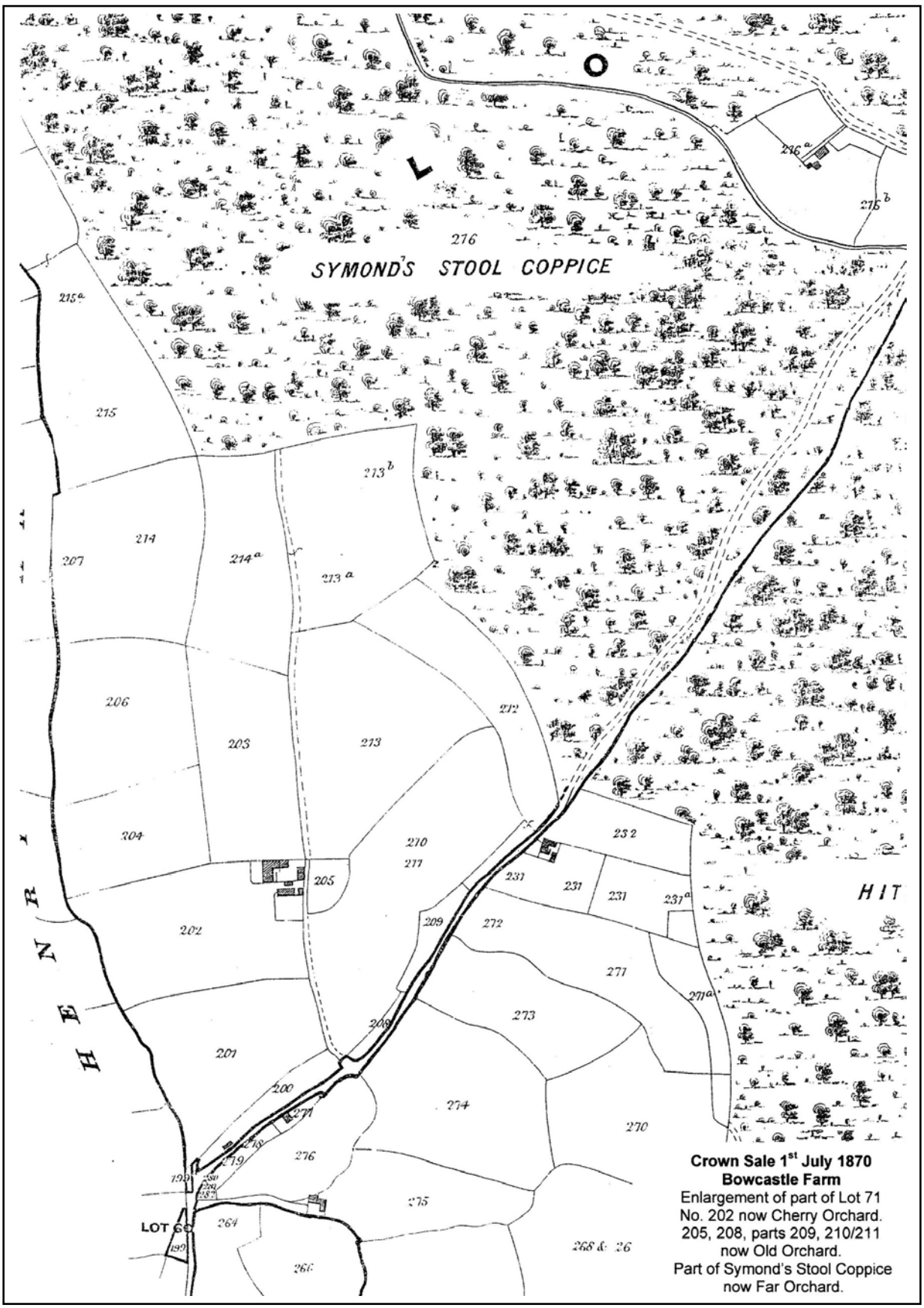
Grid North

English Nature
Hereford & Worcester Team
Bronsil House
Eastnor
Nr Ledbury
Herefordshire
HR8 1EP

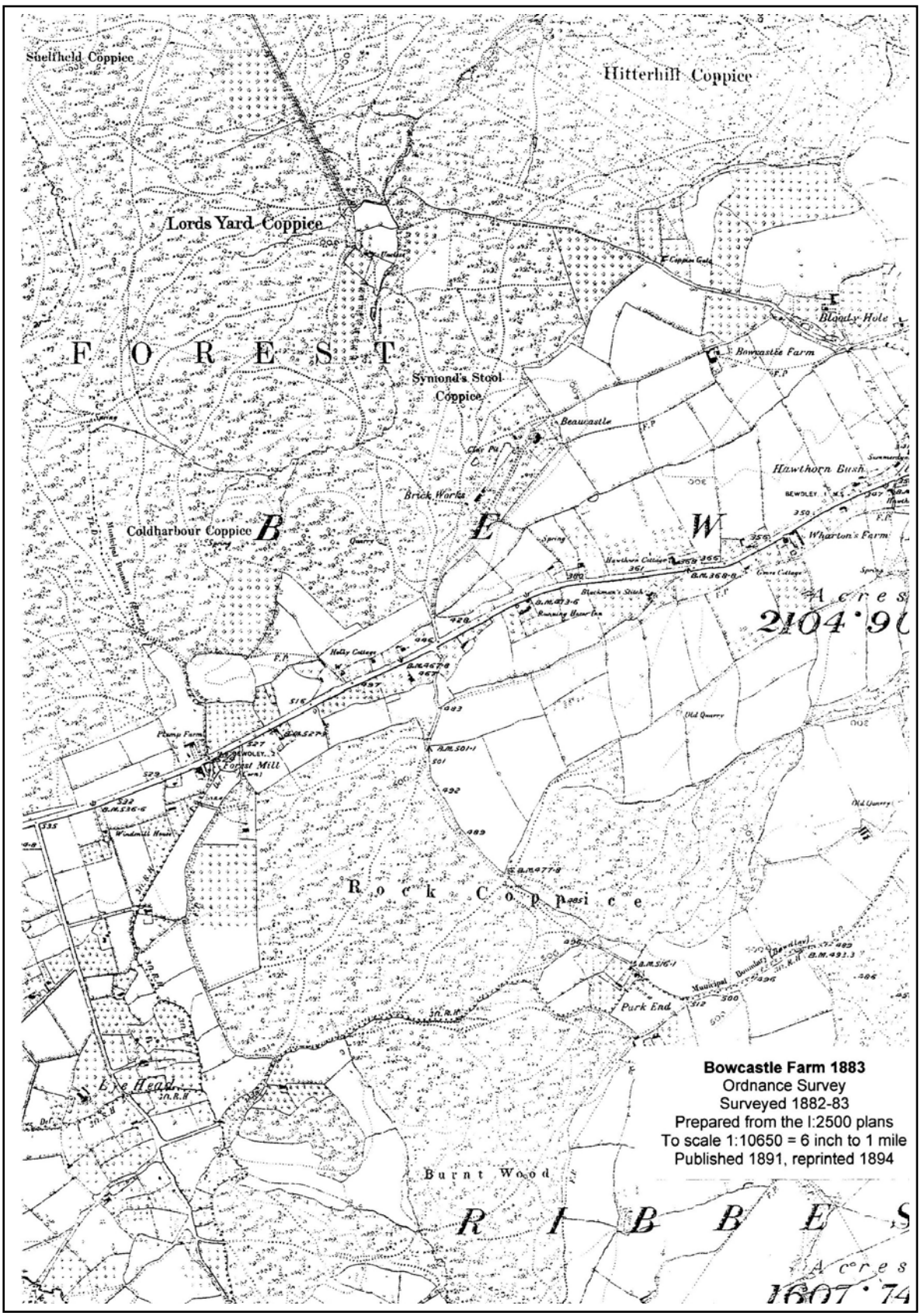
Appendix F: Map F2



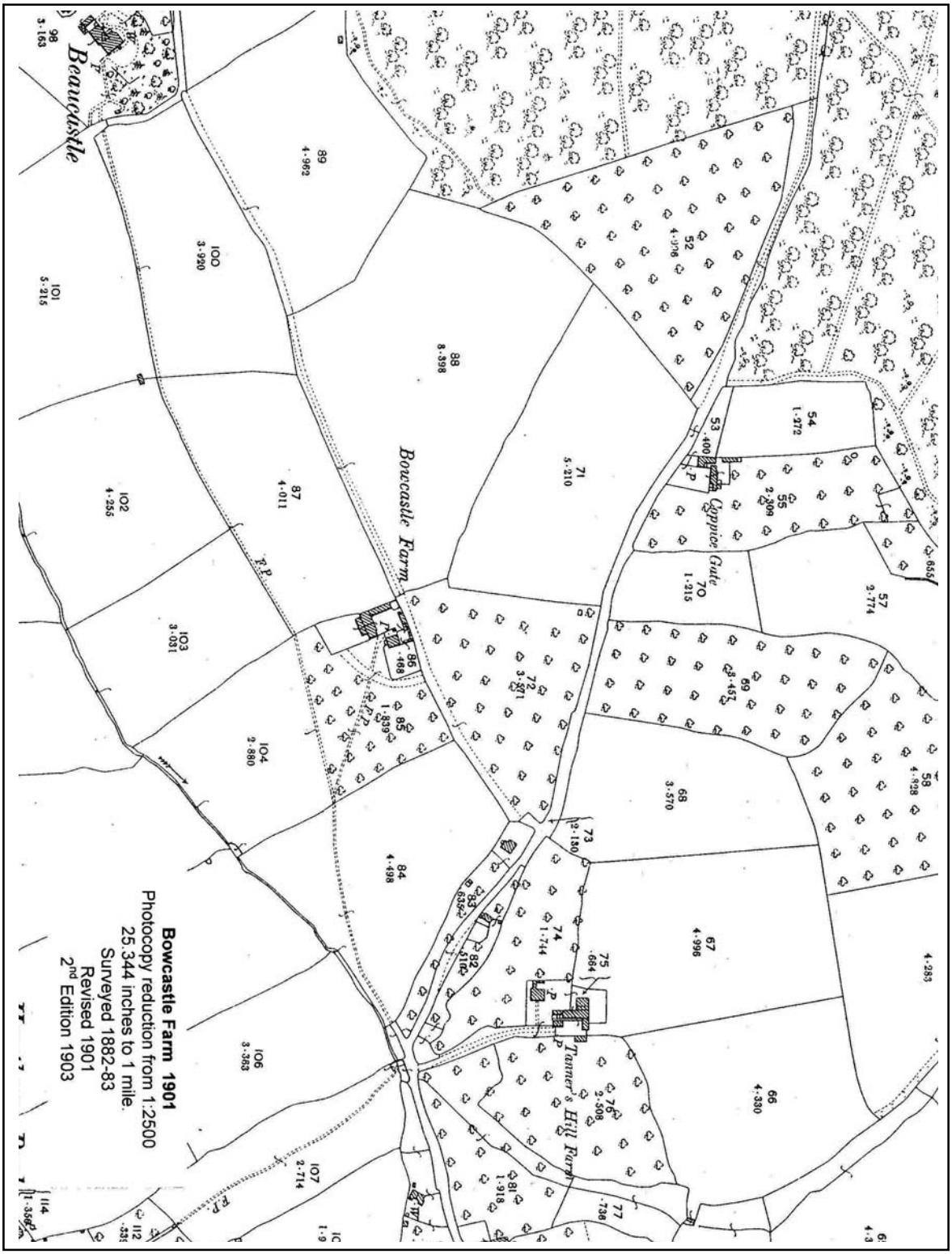
Appendix F: Map F3



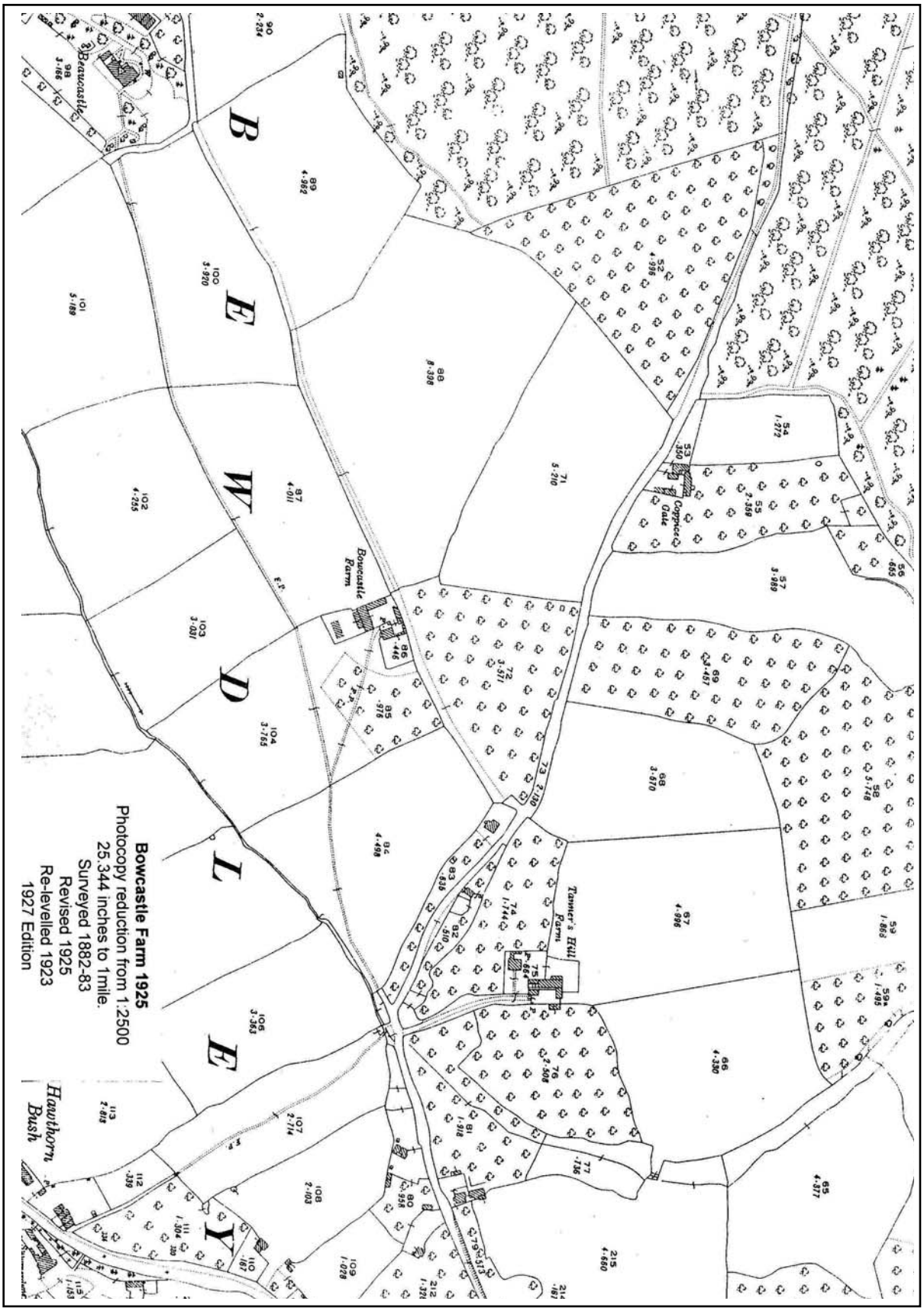
Appendix F: Map F4



Appendix F: Map F5



Appendix F: map F6



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Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
Paul Glendell/English Nature 24,888