

A random sample survey of the changing
condition of traditional orchards within the
most important UK area for Noble Chafer
Gnorimus nobilis 2003-2015

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for
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1 SUMMARY

Natural England is currently working on a GB Species Status Review of Scarab Beetles using the IUCN Guidelines for Regional Red-listing. A key criterion for meeting Threatened status is evidence for habitat decline. There is plentiful anecdotal evidence for continuing decline in habitat quality and even loss of traditional orchards within the known British range of Noble Chafer, but until now no statistically valid analysis. The PTES therefore commissioned the author to assess the current condition of 42 orchards within the known range - randomly selected - which have been documented through the Traditional Orchard Survey and associated Noble Chafer survey work (2001-5) and many of which have been subject to specialist survey for Noble Chafer.

Six of the 42 orchards and part of a seventh (15% in total) were found to have been lost, i.e. although mapped by the Traditional Orchard Survey they were now found to no longer meet the criteria to be defined as traditional orchards. These lost orchards include one which was known to contain Noble Chafer as recently as 2005. **A loss rate of 15% over an approximately 10 year period is far worse than had been suspected, and clearly demonstrates the severe threat faced by traditional orchards in this area and by Noble Chafer in particular.**

Other orchards are in poor and declining condition due to current unsympathetic management. Further orchards are in poor and declining condition due to complete abandonment of management. Others continue to be grazed but the trees neglected: **A total of 15 additional traditional orchards (36% of the random sample) are assessed as having no future while the present management approach continues, although it is difficult to project the timescales for the predicted loss. The overall proportion of the random sample of traditional orchards that are either destroyed or in declining condition is therefore 51%.**

These 15 include five sites which are - or were - known to have Noble Chafer.

During the same period, agri-environment schemes have included special provisions for restoration of traditional orchards within the range of Noble Chafer, but clearly the take-up has been woefully inadequate. While those agri-environment schemes may have provided a brief reprieve for some traditional orchards, the long-term trend remains severely downhill. The Traditional Orchard Survey reported that orchards in England have declined by more than 60% in the last 50 years, i.e. an average of 1.2% pa, which is actually less than that determined by the 2015 study. This sample suggests that the trend for orchard loss is accelerating.

Losses documented in 2015 arose from clearance for improved sheep-grazing, for horse paddocks, and as part of garden development. Other traditional orchards have either been completely abandoned or continue to be grazed but the trees neglected. A total of 20 orchards were found where re-stocking of gaps has been occurring – presumably through agri-environment schemes - but these include two sites where the new trees are not being adequately cared for, and are currently being damaged by livestock.

2 INTRODUCTION

2.1 Background

Natural England has commissioned a new Species Status Review for the Scarabaeoidea group of beetles, to be carried out over 2014 and 2015; this group of beetles includes Noble Chafer. The new Review updates that of Hyman (1992) and for the first time uses the criteria developed by the IUCN for red-listing at regional and national scales (IUCN, 2012). The time period used by the IUCN Guidelines is '10 years or 3 generations, whichever is longer (100 years max.)' and it is generally assumed that the generation time for most invertebrates will mean that the 10 year period will apply. This means that the conservation status of invertebrates needs to consider threats that have occurred over the past 10 years and which are projected to continue during the following 10 years.

2.2 Conservation status assessments

The first assessment of the conservation status of British insects was carried out over 1978-1986 (Shirt, 1986) and Noble Chafer was placed in British Red Data Book Category 3 ('Rare'). Hyman (1992) subsequently re-assessed its conservation status as BRDB Category 2 ('Vulnerable'). The definition provided for 'Vulnerable' species at that time was:

- taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating.

The criteria were:

- species declining throughout their range;
- species in vulnerable habitats.

Hyman (1992) listed the main threats as:

- loss of broad-leaved woodland and old orchards through, for example, clear-felling and conversion to other land-use;
- habitat loss, in particular, through the felling of ancient trees, removal of dead wood from living trees and the destruction or removal of standing and fallen dead wood for reasons such as aesthetic tidiness, public safety or for use as fire wood.

Noble Chafer was subsequently high-lighted as a Priority Species under the UK Biodiversity Action Plan, with Traditional Orchards high-lighted in their own right as a Priority Habitat. The PTES became the Lead Partner for Noble Chafer conservation action and initiated a programme of surveys aimed at documenting known sites for the beetle, and later set up the Traditional Orchard Survey (TOS) to fully document the habitat across the country. Priority Species and Habitats now receive a modicum of legal protection as species and habitats of 'Principal Importance for the conservation of biodiversity' within the Natural Environment and Rural Communities (NERC) Act of 2006. This provision makes it a statutory duty on planning authorities and other decision makers to consider these species and habitats when carrying out their duty to further the conservation of biodiversity.

Alexander and Bower (2011) reviewed the great improvements in knowledge of the species' ecology and distribution in England that had been achieved through the PTES's survey work since 2001, and gave their opinion that the species was still very much 'Vulnerable'. They identified fragmentation of old-tree landscapes as the key conservation issue, producing smaller and less viable populations which are increasingly isolated from each other: "it is doomed to extinction unless traditional orchards and/or wood pastures can be conserved at landscape scale". They commented that agri-environment schemes may not be effective enough at landscape scale as they operate on a farm by farm basis. Product development was suggested as the only effective conservation solution to halting the species' decline in the English countryside – unless markets can be developed for orchard produce then traditional orchards will continue to decline. While some apple and pear orchards continue to have some economic value to the landowners – for juice, cider or perry - plum orchards in particular currently offer little or no economic incentive for their maintenance.

Despite this expert opinion on the species' current conservation status and threats, the early feedback from the NE Species Status Review process suggested that Noble Chafer would not meet the IUCN criteria for Red-listing in Britain. A key information gap identified was the lack of objective data on declining condition and loss of traditional orchards within its British range. The PTES therefore agreed to fund a project to produce data on current condition of traditional orchards in relation to the results of the earlier Traditional Orchard Survey work.

3 METHODOLOGY

3.1 Basic approach

The project aimed to re-survey a random sample of traditional orchards across the known range of Noble Chafer in the nationally most important population, in the Three Counties: Gloucestershire, Herefordshire and Worcestershire. The sample orchards would include approximately equal numbers of orchards known to support Noble Chafer and those where the beetle has not been detected. This would provide a check on any differences between these two groups, whether or not Noble Chafer occupied orchards are changing in a different way to the norm.

Each of these orchards would then be inspected from public rights of way and a standard Traditional Orchard Survey form would be completed for each orchard. This would produce standardised data sets about the current composition, management and condition of each orchard which could then be compared with the TOS and Noble Chafer Survey (NCS) records, and changes to the record could then be identified. Of course, the TOS and NCS were not designed with long-term monitoring in mind and so great care needed to be taken to identify real changes that had taken place. The most straightforward change would be complete destruction of the orchard, but it was often possible to form a judgement on less dramatic changes.

The dates of the aerials used during the TOS project were from 1999 (London) to 2007.

Following advice from Professor Alan Gange (Head of School of Biological Sciences, Royal Holloway, University of London) a random selection of 42 traditional orchards was identified for survey. These were taken from two sources:

- The Traditional Orchard Survey, and
- Noble Chafer Surveys commissioned by PTES (2001-2005)

Both of the data sets date from the early years of the 2000s and so are approximately 10 years old – the time period recommended by the IUCN for red-listing assessments.

The random selection was achieved in the following way:

- Traditional orchards in Gloucestershire, Herefordshire and Worcestershire with positive evidence for NC were numbered from 1-108 and a random number generator from the Internet was then used to select 21 for survey;
- The same process was then used with surveyed orchards where no evidence for NC had been found (of which there were 61 in the Three Counties region).

Both sources were used in order to guarantee that about half of the sample sites would have had known breeding populations of Noble Chafer.

The fieldwork was carried out from November 25th to 29th, 2015.

3.2 Assessing change in condition

It proved very difficult to summarise site condition and assess the extent of change when so many variables are involved. The focus had to be on the trees as these are host to Noble Chafer larvae, and so condition of the pasture/grassland was normally not considered.

3.2.1 Destroyed orchards

These were defined in the following way:

- Orchards where previous survey data is available or where the TOS examination of recent aerial imagery had found sufficient evidence to define the area as an orchard.
- Their present condition indicates severe loss of those orchard trees. In some cases the whole orchard may have been grubbed up and destroyed, in others just one tree remains in the centre of the orchard. Remnant orchard trees may occur in low numbers along the field margins.

3.2.2 Condition, trend and cause

These columns are an attempt to summarise much information. Basically, a traditional orchard which is only used for grazing and where the remaining fruit trees are increasingly old and decrepit has been categorised as under a negative trend as the end result – unless current management practices change – is destruction of the orchard. The timescales are difficult to determine as a moderate level of grazing is not harmful to the trees whereas heavy grazing will accelerate the declining health of the trees. A few cases were found of complete abandonment of management and the trees in such orchards may live longer than in grazed orchards as no soil compaction is occurring and nutrient-enrichment is much less. However, scrub development may eventually result in crown competition and cause rapid decline of the trees, as is apparently in the

Broadway Farm orchards (GLOS1063, 1069 & 2535). Thus 'poor' condition and 'negative' trend encompass a diversity of information. The 'cause of change' column attempts to explain the rationale.

In order to avoid the assumption that lack of gapping-up automatically means 'poor' condition and 'negative' trend, traditional orchards with no recent planting but where grazing levels appear moderate and where old trees appear to be being retained have been assessed as 'fair' or 'good' – the guidance has been much more of a 'feeling' that the site remains a good quality habitat for Noble Chafer and appears likely to remain so for certainly the next ten years or more. One orchard (WORC0921 upper) has been assessed as being in 'fair' condition despite the presence of large numbers of sheep as there were no obvious signs of a problem with tree health at the time of the visit – although if the grazing level has only recently increased declining tree health may not yet be apparent.

Two orchards assessed as being in 'fair' condition but with a positive trend reflect the fact that there has been gapping-up in recent years but the few remaining old trees may not be sufficient to carry any resident populations of Noble Chafer into the near future – the young trees may not provide suitable habitat in time. This is a judgement and the actuality remains to be proven.

Gapping-up needs to have taken place within the past ten years for the purposes of this study.

4 RESULTS

A summary of the full data set is provided in Appendix 1. The completed TOS survey forms have been lodged with PTES.

Six of the 42 orchards and part of a seventh (15% in total) were found to have been lost, i.e. although mapped by the Traditional Orchard Survey in the 2000-2007 period as existing traditional orchards, they are now found to no longer meet the same criteria to be defined as traditional orchards:

- GLOS2099 – incorporated into garden;
- GLOS2125 – disappeared completely, absorbed into larger field;
- GLOS2134 – last remnants cleared from horse paddocks;
- WORC1609 – cleared for pony paddocks;
- WORC1506 – only a single apple tree survives in sheep pasture;
- WORC2523 – largely cleared of trees then abandoned;
- And two of the three sections of WORC1284 cleared for sheep pasture.

These lost orchards include one (WORC2523) which was known to contain Noble Chafer as recently as 2005.

Others are in poor and declining condition due to current unsympathetic management, eg:

- HERE4341 part absorbed into garden; one left in sheep pasture;
- WORC0921 lower orchard, sheep stocking very high

- The larger third of WORC1284, where stocking with sheep considerably exceeds the carrying capacity of land and bark-stripping is damaging recently planted apple trees (Countryside Stewardship funded according to a sign)



Fig 1. Traditional orchard GLOS2125 as found in November 2015



Fig 2. Traditional orchard WORC 1609 converted to pony paddocks;
A single apple tree remains in the centre



Fig 3. Traditional orchard WORC1284
- orchard trees removed & the ground overgrazed by sheep



Fig 4. Traditional orchard WORC1813
All except one apple tree cleared and mostly burned



Fig 5. Traditional orchard GLOS2124 - neglect of the plum trees



Fig 6. Traditional orchard WORC0921
- Lower orchard with neglect of plum trees

Further orchards are in poor and declining condition due to abandonment of management:

- WORC0695
- WORC0698

Others continue to be grazed but the trees neglected.

A total of 15 additional traditional orchards (36%) are therefore assessed as having no future while the present management approach continues, although it is difficult to project the timescales for the predicted loss. The grand total for negative management of traditional orchards therefore is 51%.

These include five sites which are known to have Noble Chafer

5 DISCUSSION POINTS

5.1 Traditional orchards continue to be under severe threat

A loss rate of 15% over an approximately 10 year period is far worse than had been suspected, and clearly demonstrates the severe threat faced by traditional orchards in this area and by Noble Chafer in particular. With a further 36% in longer-term decline through neglect, the total of 51% under negative trend can only be described as alarming.

Losses documented in 2015 arose from clearance for improved sheep-grazing, for horse paddocks, and as part of garden development. Other traditional orchards have either been completely abandoned or continue to be grazed but the trees neglected. A total of 20 orchards were found where re-stocking of gaps has been occurring – presumably through agri-environment schemes - but these include two sites where the new trees are not being adequately cared for, and are currently being damaged by livestock.

5.2 Agri-environment schemes

During the same period, agri-environment schemes have included special provisions for restoration of traditional orchards within the range of Noble Chafer, but clearly the take-up has been inadequate. While those agri-environment schemes may have provided a brief reprieve for some traditional orchards, the long-term trend remains severely downhill. The Traditional orchard Survey reported that the number of orchards in England have declined by more than 60% in the last 50 years, i.e. an average of 1.2% pa, which is actually less than that determined by the 2015 study. The figures are not directly comparable however as the 60% figure has presumably been rounded for presentation purposes. The implication is that either the agri-environment schemes have had no overall impact on the loss rate or that they have slowed and stalled an otherwise accelerating loss rate.

Continuity of management is essential for the long-term survival of traditional orchards in the English countryside and the present Government support through agri-environment schemes does not provide that continuity. The indications are that it merely temporarily interrupts the loss rate.

Agri-environment scheme statistics**Gloucestershire**

Total number of traditional orchards	2143
Number in Environmental Stewardship	124
Options:	
HC18 – Maintenance of high value traditional orchards	36
HC20 – Restoration of traditional orchards	71
HC21 – Creation of traditional orchards	37

Herefordshire and Worcestershire

Total number of traditional orchards	5813
Number in Environmental Stewardship	315
Options:	
HC18 – Maintenance of high value traditional orchards	98
HC19 – Maintenance of traditional orchards in production	11
HC20 – Restoration of traditional orchards	175
HC21 – Creation of traditional orchards	85

Data provided by Natural England

5.3 Is there a way forwards for the conservation of traditional orchards?

Lack of management or poor management is the real reason for orchard quality decline. Better orchard management might be supported by agri-environment schemes (AES), but it is the land owners or managers who are responsible for orchard management. It may be that lack of knowledge about appropriate management is the greater reason for poor quality – either the managers and/or their advisers. Improvements in training of land management advisers may be required. It might be more successful for the AES teams to be supporting the development and diversification of markets for orchard produce than trying to subsidise particular approaches to orchard maintenance. A real economic incentive for orchard maintenance might be expected to be far more successful in conserving traditional orchards. Until there are profitable markets available for produce from traditional orchards they will continue to be neglected, abandoned or even cleared away.

Juicing has become a popular use of apple and pear orchards, and cider and perry production may also be economically viable. One Somerset producer has developed a market for apple brandy. Nobody in Britain appears to be interested in developing plum brandy as a productive use of the traditional plum orchards of west Gloucestershire, and yet ‘eau-de-vie’ is a popular spirit in France. It is difficult to understand why wider markets have not been developed for orchard products. The main disincentive is presumably the lack of funding as pump-primers?

The big question is: who should carry these ideas forwards? Is PTES able to become involved in the wider economic issues? Or is this a role for the Government agencies? In the current economic climate, initiatives from charities are more likely to succeed than Government initiatives. Are these questions being addressed by the Traditional Orchards HAP Working Group?

6 ACKNOWLEDGEMENTS

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APPENDIX 1 SUMMARY OF RESULTS FROM THE 2015 RANDOM SAMPLE SURVEY OF ORCHARDS

Orchards sorted by extent of loss and decline:

Code	NC evidence	Condition	Trend	Cause of change	Destroyed
GLOS2125		destroyed	negative	cleared away for sheep pasture	Destroyed
GLOS2134		destroyed	negative	clearance for horse paddocks	Destroyed
WORC1609		poor	negative	pony paddocks	Destroyed
WORC1506		poor	negative	only one live apple tree left	Destroyed
WORC2523	larva 2005	poor	negative	clearance & abandonment	Destroyed part
WORC1284	frass 2003	poor	negative	two areas cleared; main area overgrazed by sheep & damaging new plantings	destroyed
HERE4341	adult 2005	poor	negative	part absorbed into garden; rest remnants in sheep pasture	most gone
WORC2287		poor	negative	trees neglected	little left
GLOS1063	frass 2001	poor	negative	trees neglected	
GLOS1069	frass 2001	poor	negative	trees neglected	
GLOS2099		poor	negative	trees neglected; mostly lost	
GLOS2101		poor	negative	trees neglected	
GLOS2109		poor	negative	trees neglected	
GLOS2110		poor	negative	trees neglected	
GLOS2124		poor	negative	trees neglected	
GLOS2535	frass 2001	poor	negative	trees neglected	
WORC0695	frass 2003	poor	negative	Abandonment	
WORC0698	frass 2003	poor	negative	Abandonment	
WORC0921 lower	frass 2003	poor	negative	trees neglected; overgrazed	
WORC2536		poor	negative	trees neglected	

Code	NC evidence	Condition	Trend	Cause of change	Destroyed
WORC2548		poor	negative	trees neglected	
WORC2541		mixed	negative	clearance; poor maintenance of recent plantings	
GLOS2104		fair	negative	trees neglected	
	fragment				
WORC1337	1999	mixed	mixed	garden development	
WORC0921		fair		heavily sheep grazed	
		good to			
GLOS2199	larva 2002	fair			
HERE2504		good			
HERE2911	frass 2003	good			
HERE2916	frass 2003	good		no new plantings	
HERE3369	frass 2005	good			
WORC1013	larva 2001	good		no new plantings	
WORC1019		good		new plantings	
WORC1290	frass 2003	good		no new plantings	
WORC1507		good		new plantings	
WORC1555		good			
WORC1601		good			
WORC2352		good			
WORC2511	frass 2004	good			
	fragment				
WORC2530	2001	good			
GLOS2188	frass 2003	fair	positive	new block of plantings	
WORC2524	frass 2004	fair	positive	new plantings	
GLOS2113		good	positive	new plantings	

