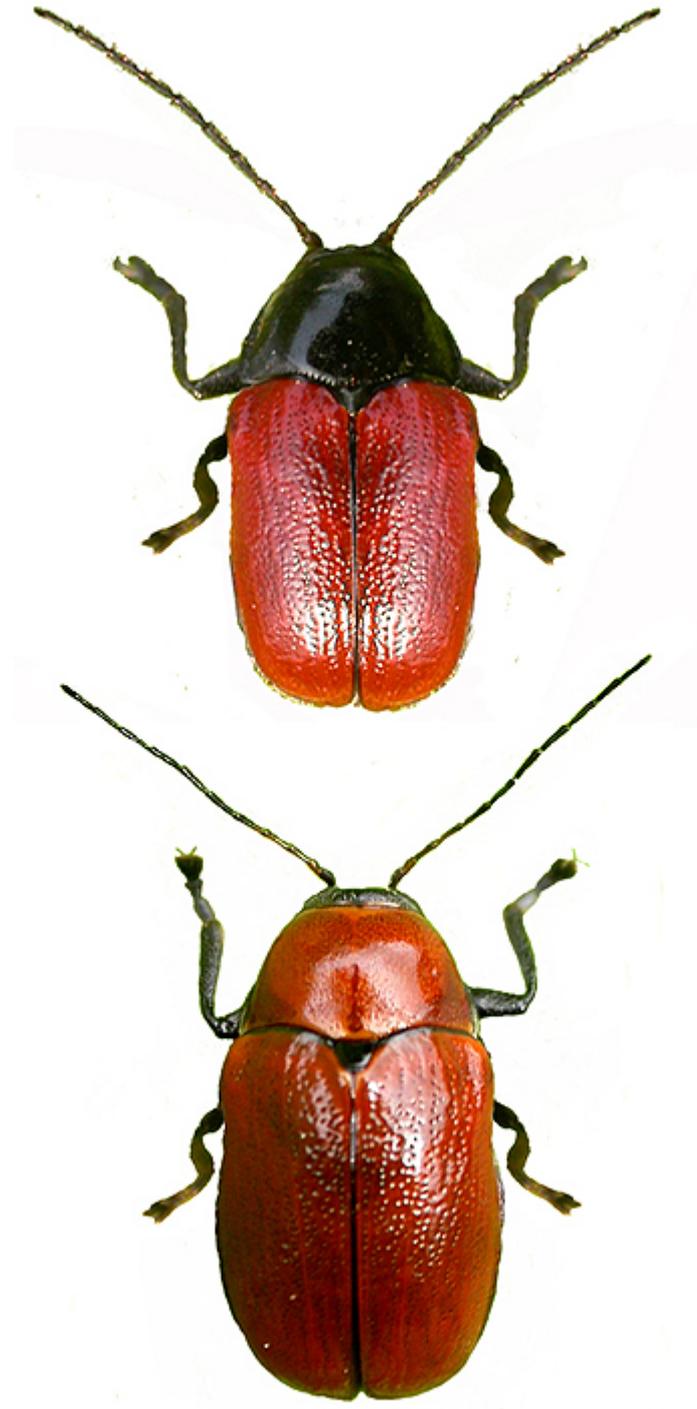


The current status and distribution of *Cryptocephalus coryli* and Nottinghamshire's other *Cryptocephalus* beetles

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1.0 Introduction

This document brings together much of what we have written about *Cryptocephalus* leaf beetles on the website www.eakringbirds.com. After recording, studying and rearing most of Nottinghamshire's seven resident species in captivity for several years, we thought that bringing our findings together into a single document would perhaps be useful for those wishing to undertake further study.

Another of our objectives is to use this opportunity to provide up to date distribution maps for each *Cryptocephalus* presently occurring in Nottinghamshire (VC56).

Many of the UK's 20 species are uncommon and several are rare. 14 are either Red Data Book listed, or Nationally notable A or B. Many species are quite specific in their habitat preferences and they are generally thought to be poor colonisers, showing a reluctance to move far enough to colonise new sites. Quite a number of our *Cryptocephalus* are in decline.

2.0 Known UK *Cryptocephalus* species and their current national status

The following species are currently on the UK list.

Cryptocephalus aureolus Nb
Cryptocephalus biguttatus RDB2
Cryptocephalus bilineatus Nb
Cryptocephalus bipunctatus Nb
Cryptocephalus coryli RDB1
Cryptocephalus decemmaculatus RDB2
Cryptocephalus exiguus RDB1
Cryptocephalus frontalis Na
Cryptocephalus fulvus
Cryptocephalus hypochaeridis
Cryptocephalus labiatus
Cryptocephalus moraei
Cryptocephalus nitidulus RDB1
Cryptocephalus parvulus Nb
Cryptocephalus primarius RDB1
Cryptocephalus punctiger Na
Cryptocephalus pusillus
C. querceti RDB2
C. sexpunctatus RDB2
C. violaceus.

2.1 *Cryptocephalus* beetles in Nottinghamshire

Including historical records, Nottinghamshire has recorded just eight species of *Cryptocephalus*, most of which were listed by Carr in his book '*The Invertebrate Fauna of Nottinghamshire*' published in 1916. It should be noted that the occurrence of *Cryptocephalus nitidulus* in Nottinghamshire, would have been classed as historical, even when Carr published his book. *Cryptocephalus parvulus* has only been recorded from one site in the extreme north of Nottinghamshire.

Cryptocephalus coryli RDB1
Cryptocephalus fulvus
Cryptocephalus labiatus
Cryptocephalus nitidulus RDB1 (Long extinct in Nottinghamshire)
Cryptocephalus parvulus Nb
Cryptocephalus pusillus
Cryptocephalus moraei
Cryptocephalus querceti RDB2

3.0 The life-cycle of *Cryptocephalus* beetles

Cryptocephalus leaf beetles, have one of the most interesting life histories of any of our resident beetles. Aside from many UK species being nationally rare or endangered, *Cryptocephalus* beetles are renowned for their larvae living in purpose built 'pots'.

Once mated, the female begins to lay, with the rate of egg production increasing a few days after successful mating. Each egg is laid singly. The egg is bare when first produced, but by holding the egg between her rear tarsi, the female begins to turn it and cover it with dung. One end of the pot is left blunt, the other rounded. Once the egg is completely coated, the female drops the 'pot' to the ground.

After hatching, the young larva makes a hole through the blunt end of the pot, through which it can emerge to feed and move about in the leaf litter. As the larva grows, it regularly enlarges the pot by making a slit lengthways along the underside of the pot, opening it slightly and then filling the slit with fresh faeces.



Prior to all skin changes and larval over-wintering, the larva seals the open end of the pot, leaving just a tiny hole for ventilation. The whole process of larval development is photographically illustrated on the internet at www.eakringbirds.com.

The finished pots of *Cryptocephalus coryli* eventually attain a length of between 10-14mm, but the pots of other *Cryptocephalus* species are much smaller. In the wild, larval development takes two years (over-wintering about half-grown) but larvae can occasionally become full grown within a year, when kept in captivity. Larval feeding in both years, ends surprisingly early, usually in August and first year larvae remain dormant until the first warm days of the following Spring when feeding recommences. Second year larvae remain dormant until hatching as adults.

Once mature, the larva attaches the pot to vegetation and seals the end, before turning 180° to face the other way and eventually pupates. Pupation is believed to take place in the early Spring. When the beetle emerges, it neatly cuts the end off the pot and climbs the nearest vegetation before flying.

4.0 Species accounts

4.1 *Cryptocephalus coryli* (Linnaeus, 1758)

Literature often states that *Cryptocephalus coryli* (commonly known as the Hazel Pot Beetle) was once a widespread beetle across the southern counties of England and that it declined greatly during the last century to become one of the UK's rarest insects. It is currently designated as RDB1.

It's decline is thought to have coincided with the reduction in coppicing. In the south of the UK, it occurred on hazel growing along woodland edges, rides and hedgerows, but in the north preferred a heathland habitat with Birch scrub or young trees. However, many now believe that it was never a common beetle and was always rather restricted in its UK range.

Historically, *C. coryli* was known from two Nottinghamshire sites. These were Langford Moor near Newark in 1899 (Thornley) and from Sherwood Forest between 1899 and 1907 (Kidson-Taylor, Hardy, Donisthorpe and Bedwell) with research revealing additional records from Sherwood Forest in the late 1930's and 1940. These latter Sherwood Forest records, remained something of a mystery until early in 2011, when work to re-organise the coleoptera collection at Leicestershire Museum CRC at Barrow-upon Soar, finally helped clear up some of the confusion regarding records dating back to around this time. The re-organisation also provided additional records dating from 1929, 1939 and 1940, which seemed to have been previously unknown or had somehow been lost from the record books. Most of these records listed no recorder or determiner.

Cryptocephalus coryli was rediscovered in a small area of Sherwood Forest CP in 2008 (Pendleton, T.A. and Pendleton, D.T.), after an absence of over 70 years and continues to remain there, despite the occasional decline in population numbers some years. In July 2013, it was discovered in an area of Clumber Park (Binding, A. E. and Binding, A.) and an unconfirmed sighting from Budby South Forest, was reported to us that same year.

4.1.1. The present status of *Cryptocephalus coryli* at Sherwood Forest and in the UK

Until very recently, Sherwood Forest was believed to be the only site in the UK where it was known to still occur. However, an email sent to us in September 2012, implied that *Cryptocephalus coryli* was still being recorded from sites in Surrey, Hampshire and Lincolnshire, although no records had actually been received by the National Chrysomelidae Recording Scheme when the email was received.

We know that it is currently doing well at Sherwood Forest, but it is strongly believed that *C. coryli* is still present at Box Hill and Headley Warren in Surrey (per Denton, J. and Collins, G.) but no one has purposely looked for it in the last few years. There have been no records from Woolmer Forest in Hampshire, since it was recorded there for the first time in 2002 (Lawn, M.) despite further searching, and there have been no records from any of the Lincolnshire sites, other than at Whisby since 2007 (per Barnes, C.).

4.1.2. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2008

There were a total of three records of *C. coryli* from Sherwood Forest in 2008. All three related to females, one of which spent several days on a small Birch and was photographed egg-laying on at least one occasion. The records and notes on their discovery are listed below.

Following the discovery and identification confirmation of the first female on 28/05/08, further visual searches of Birch/Oak scrub foliage in other nearby compartments were made. These took place on an occasional basis until late June.

Visual searches soon proved successful on a further two occasions, with another found a day after the first on 29/05/08 and a third, a few days later on 04/06/08. This female remained present till 07/06/08, never leaving her favoured Birch twig and was photographed in the process of egg-laying on at least one occasion.

The favoured Birch was just less than a metre tall, but just over a metre wide. Adjacent scrub was predominantly Oak of various sizes and a single small Hawthorn. Across the path there is an area of open, grassy heathland, in which there are several small areas of Birch scrub. These could be utilised as suitable sites for egg-laying females, but may be situated too far from the woodland edge.

It is possible that the Oak scrub was ignored by the females, due to being severely frost damaged after leaf emergence. By the time the Oaks had recovered, the *C. coryli* emergence/breeding period was over. The Birch also held numbers of Hairy Shieldbug (*Dolycoris baccarum*) and the Ant (*Formica fusca*). No prolonged observations were made at the time to determine whether these two species had any adverse effects on the female *C. coryli* present, but any effects must have been minimal given the female's lengthy duration of stay.

4.1.3. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2009

The first adults (four) were found on May 10th, but casual searching actually commenced at the end of April. Hatching of the adults seemed to coincide with fine days, on which the temperature was fairly warm. Many adults were found on grass, including one female which was photographed egg-laying whilst on grass, both observations which had not been recorded before. Between May 10th and June 12th, we recorded a total of 13 adults of which four were males. Further adults were recorded during a targeted survey by Allan and Annette Binding.

Adults were found over a larger area than in 2008, but still in a restricted section of Sherwood Forest CP. Records throughout the Spring indicated that this beetle is largely found along the southern and eastern edges of one section of Birch and Oak woodland within Sherwood Forest CP, with adults generally being noted on grass (providing most records) or on Hawthorn and Birch scrub.

The number of adults found during 2009 indicates that Sherwood has a very healthy population of *C. coryli* and an appeal for more information by Allan and Annette Binding on the few other known UK sites for this beetle, saw no response. It appears that known sites in Lincolnshire have also proved negative for *C. coryli*.

4.1.4. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2010

Despite having the coldest Winter for many years, we began actively searching for the first *C. coryli* from around the start of the last week of April 2010.

The weather hampered searches for any very early adults and despite some fine sunny days there were overnight temperatures down to -3 during early May. As in 2009, all scrub Oaks were affected by frost, meaning that at least if any beetles were to emerge, then they would most likely be on grass, or on the limited amount of scrub Birch and Hawthorn (both unaffected by frost and in full leaf) available on site.

On May 16th, some three weeks after the start of our search, we found the first female on a small scrub Birch along a south-facing section of Birch woodland. This remained the only record until June 19th, when a male was found on young Oak growth on a stump cut down during the Winter.

4.1.5. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2011

Following on from a poor year for *C. coryli* numbers, coupled with an exceptionally cold period at the end of 2010, it was always going to be a guess as to what would happen in 2011. Certainly the weather during the early months of this year was especially favourable, with the remainder of the Winter and early Spring being very dry. April's dry and at times very warm weather, saw many invertebrates produce early first dates and the first adult *coryli* (a male) was found on the exceptionally early date of April 23rd. This was certainly the earliest record for Sherwood Forest and very early nationally, with mid-May to early June generally being regarded as the main emergence period for adults.

It was May 1st before the first female was found on a small Oak, but this was still another early date. She was photographed, but very quickly took flight and flew high up to the top of a nearby mature Birch. We made a return visit to the site in the late afternoon, to mark the locations of this year's two *C. coryli*, and found a third adult (a male) on a lower branch of a large Birch.

May 2nd saw a further two females found on a small Oak (which soon flew off unseen) and a large Birch respectively and within a few feet of each other. Scanning the lower branches of large Birches growing along the southern edge of the favoured area with binoculars on May 3rd, revealed another male and two females, bringing the total of adults for the year to eight.

May 4th was a significant day, when a concerted effort was made to check the higher branches of the mature Birches along the edge of the favoured plantation. Binoculars and a Kowa telescope were used to find and sex any adults, resulting in a staggering total of 11 adults including six females and five males. One Birch alone produced three males in close proximity to each other. Perhaps a more important discovery, was a male and female found in a new location, slightly away from the known population. This new location provided additional records of females found on May 6th and then recently hatched on May 10th.

A technique employed by adults in windy conditions, came to light on May 8th. After scanning the upper reaches of Birches with binoculars and a scope revealed no adults, the reason for this was made clear by this female (shown left) found on a small scrub Birch, who was literally clinging on to the stem rather than the usual method of sitting directly on the leaf in fine conditions. Even with their red colouration, *C. coryli* are surprisingly difficult to see when adopting this position on small scrub Birch and Oak. By May 8th, the total number of adults found had reached 26, with the percentage of females being greater.

On May 9th we were able to conduct the first of two unique surveys with the very kind help and support of WKW Tree Services. The surveys were based at tree top height, using a cherry picker operated for us by the extremely willing Matt Vaughan. At the end of six hours, a total of 14 *C. coryli* had been located, which was a new record total, despite the windy conditions. All but one were at the very tops of mature Birches lining the southern edge of the favoured location, including one mating pair. With the wind being so gusty at times, all of the beetles were slightly down the Birch stems, clinging on tightly in the manner we noted the previous day when conditions were similar.

The period May 11-17th continued to provide more records, with the total adults for the year eventually reaching 50 on the latter date. This period also brought with it slightly unsettled weather, cooler and frequently too windy to check the tops of Birches for adults, but also provided a string of records of recently hatched adults on either Willowherb or grass. It seemed obvious that newly emerged adults will hatch in slightly cooler conditions, but remain on the grass etc, until conditions are warm enough for flight. Probably the most pleasing of all our *C. coryli* finds during this period, was eventually finding a half-grown larva and pupa in leaf litter on May 16th, directly

underneath a newly emerged male. This was a personal triumph for us after spending many fruitless hours searching leaf litter and grass tussocks during the late Winter and early Spring period.

During the second half of May, conditions (although largely dry and sunny) were often windy, so it was not possible to survey the higher Birch foliage until early June. A few adults still kept turning up though, mostly on one clump of scrub Birch, but we also several found newly hatched adults on grass. On June 2nd, the weather was finally still, sunny and warm, so a couple of hours were spent scanning the tops of Birches with binoculars and a scope. A total of 15 adults were located (eight males and seven females) mostly very high up. Notable were two males and a female on the same leaf at the top of a Birch at the eastern end of the Gleadthorpe open, a grassy area within the country park.

There seemed to be a sudden end to the adult season, with just one solitary female with a damaged elytra, found in another new area on June 9th and remaining on the same scrub Birches until June 24th. Largely windy conditions continued, making scanning with binoculars and a telescope impossible, but also proving to be surprisingly fruitless when it was calm enough. A second tree top survey using the cherry picker was again conducted at the end of July and whilst we knew that finding any *coryli* was always doubtful, it was still worth the effort to check. A total of 71 adults were found during 2011.

4.1.6. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2012

There was a slightly later start to the 2012 season than in the previous two years, with the first female found recently emerged on coarse grass, during a short afternoon site survey on 17/05/12. 2012 proved to be an interesting year for this Sherwood speciality, with a further small increase in site range, but it was not all good news. Site management in the area of the Country Park favoured by *C. coryli*, at times remains an issue and late in 2012, a work party effectively removed all the Birch and Oak scrub (shown below) from an area used by *coryli* to allow heather/heathland regeneration. It was disappointing to us as recorders, that a small area of habitat be given precedence over the possible requirements of an endangered (RDB1) species and it was not the fault of the work party.

Despite our growing leaning towards *C. coryli* not being totally dependant on Birch scrub (as had been believed) females certainly do use scrub at times, although we don't know yet whether this is accidental or quite deliberate. Despite many hours in the field, we have also been unable to ascertain whether they actively seek out and use Birch scrub from a certain point in the Spring. It could be that mature Birch leaves lose some of their nutritional value as a food source and that the adults (in particular females) then seek out Birch scrub. Trouble is, it will be difficult for us to determine now.

An exciting discovery was made on 20/05/12, when Ranger Gary Joynt found a female at the base of a Birch trunk, effectively changing our knowledge of *Cryptocephalus coryli* at Sherwood Forest. The importance of the find was that this beetle was discovered for the first time within closed canopy woodland, around 50-60 metres away from the woodland edge where the beetle regularly occurs. The location of this newly emerged female amazed us, meaning that *C. coryli* must also be found on Birches situated quite deep within areas of woodland and that they are not completely confined to warm south-facing trees or woodland edges. Taller Birches standing slightly above adjacent trees must also be capable of attracting females, possibly due to their prominent position above the tree canopy.

A total of 40 adult *C. coryli* were recorded between 17/05/12 and 18/06/12, with a ratio of 19 females to 21 males. The figures for 2011 were 71 adults (42 females to 29 males). Two surveys using optics were conducted on favourable days, with a total of 12 adults, including eight males and four females found on 23/05/12, including one pair observed in cop. All adults were located near the top of Birches growing along the woodland edge, typically favouring trees in the 25-35 feet range and with healthy foliage.

The next morning saw an early binocular/telescope survey start of 7am, but no adults were located until around 08:45h when they became active, despite the warm, sunny conditions. The survey concentrated on trying to further establish the range of *C. coryli* on site, rather than go for numbers. This was successful, with two females located at the very tops of two Birches, at around 30 feet height and situated in suitable habitat.

They were in an area that we have consistently searched for them in since 2009, always feeling that it would produce records, but much sooner than the four years it has taken. However, the downside to this good news, was that two of the compartment boundaries had been changed earlier in the year and that the trees the beetles were located on, were now in a grazed enclosure! While the adults can utilise these trees in future years, it means that any resulting larvae they produce, are unlikely to ever make the change to adult, due to trampling by Longhorn Cattle and their grazing of the grass.

4.1.7. Summary of *Cryptocephalus coryli* records from Sherwood Forest CP in 2013

We did less work on the number of *C. coryli* at Sherwood Forest in 2013, due largely to the general lack of interest in the beetle's presence or status, shown by any of the NNR's management team. Numbers do appear to be stable and *C. coryli* did seem to have a good year. A total of ten adults were recorded between 19/05/13 and 30/07/13, with a maximum count of four on 22/05/13. Most of the records came from either Hawthorn or Birch scrub. No tree top surveys using binoculars or telescope were carried out this year.

4.1.8. Some notes on the habitat of *Cryptocephalus coryli* within Sherwood Forest

In the northern half of the UK, *Cryptocephalus coryli* has long been regarded as a beetle of heathland and in Nottinghamshire, all post-2008 records have come from habitat largely consisting of small areas of grassy lowland heath, either bordering (or part of) a mixed heathland/Oak/Birch scrub and Oak/Birch woodland habitat., with the ground flora containing a mix of perennials. Our research would strongly suggest, that larvae are more likely to survive where the soil retains moisture. Where the beetle is present at Sherwood Forest CP, rain water run-off from forest access tracks, often prevents the soil from drying out and allows a more diverse fauna of coarse grasses, Rosebay Willowherb and other 'rank' perennial flora to thrive.



Long regarded as being a beetle reliant on scrub Birch, *C. coryli* actually spends most of its adult life up in the tree canopy.

It was found that Birches growing along the edge of woodland with a sunny, warm aspect and with thick, healthy foliage around 30 feet above ground level, were particularly favoured by the adult beetles.

No adults were found at the very top of the largest Birches, when surveyed using a cherry picker to a height of 50 feet in May 2011, but it was obvious that the foliage quality on larger Birches was of noticeably poor quality, as these trees were nearing the end of their lives.

Over the years, published literature has suggested that *C. coryli* uses 'key' trees. These are typically described as Birch scrub or very young trees. While females are often found on Birches fitting that criteria, the number of beetles found on these is a small percentage of the actual site population.

We now firmly believe that too much emphasis has been placed on the use of scrub or very young Birch trees as being 'key' trees in the past and that 'key' groups of mature Birches are more likely, especially where the climatic conditions for the beetle are optimal and the foliage is healthy. Key trees noted in previous UK surveys, have always been habitually small and much easier to check for *C. coryli* than much larger (30-50 feet high) trees. There seems little doubt to us, that the misconception of 'key' trees being used by successive generations of females is now inaccurate. Several such trees used in 2008 and 2009 at Sherwood Forest CP, have not been used since and it is most likely that many adults found on small scrub, have just simply climbed there after emergence, as they do grass and other vegetation before their first flight.

It should be noted that the flight of *C. coryli* is much more purposeful and direct, than has been previously suggested by some other authors and that colonisation of new sites, with the correct habitat requirements is probable. We never once recorded adult *C. coryli* on mature, or semi-mature Oaks at Sherwood Forest, although adult feeding on very young, scrub Oak growth was recorded. In years of early emergence, Hawthorn scrub would often prove attractive to adults, as this would be in leaf before Birch or Oak.

4.1.9 Known Nottinghamshire records of *Cryptocephalus coryli*

The following pages list all the Sherwood Forest records of *C. coryli* up to 2014. Most of the post-2008 records include brief notes on location within the tree canopy or vegetation.

1903	Kidson Taylor, J.	N/A	Sherwood Forest
1904	Kidson Taylor, J. and Hardy.	N/A	Sherwood Forest
1906	Kidson Taylor, J.	N/A	Sherwood Forest
24/06/1907	Donisthorpe, H.	N/A	Sherwood Forest
25/06/1907	Donisthorpe, H.	N/A	Sherwood Forest
1908	Bedwell, E.C.	N/A	Sherwood Forest
05/06/1929	No known recorder	N/A	Sherwood Forest. Adult
22/05/1938	Tozer, D.	N/A	Sherwood Forest. Adult
29/05/1938	No known recorder	N/A	Sherwood Forest. Adult
05/06/1938	Tozer, D.	N/A	Sherwood Forest. Adult
12/06/1938	Tozer, D.	N/A	Sherwood Forest. Adult
26/06/1938	No known recorder	N/A	Sherwood Forest. Two adults
03/05/1939	No known recorder	N/A	Sherwood Forest. Adult
17/06/1940	No known recorder	N/A	Sherwood Forest. Adult
27/06/1940	No known recorder	N/A	Sherwood Forest. Two adults
28/05/2008	Pendleton, T.A. and Pendleton, D.T.	Female	On grass
29/05/2008	Pendleton, T.A. and Pendleton, D.T.	Female	On isolated small Hawthorn.
04/06/2008	Pendleton, T.A. and Pendleton, D.T.	Female	On Birch scrub adjacent to Birch/Oak woodland. Photographs showed this female to be egg laying. Still present on same Birch over the next few days and occasionally more active.
10/05/2009	Pendleton, T.A. and Pendleton, D.T.	Male	On grass at 11:30h (presumed recently hatched)
	Pendleton, T.A. and Pendleton, D.T.	Female	On small scrub Birch used in 2008. Found at 12:10h, then flew off.
	Pendleton, T.A. and Pendleton, D.T.	Female	On small Hawthorn used in 2008 at 14:30h. Remained till 18/05/2009, only moving when the weather warmed up.
	Pendleton, T.A. and Pendleton, D.T.	Male	On grass at 15:50h (presumed recently hatched)
12/05/2009	Binding, A.E. and A.	Female	On leaf of mature Birch (12 feet above ground level)
	Binding, A.E. and A.	Female	On small Hawthorn used in 2008
18/05/2009	Binding, A.E. and A.	Female	On small Hawthorn used in 2008
20/05/2009	Pendleton, T.A. and Pendleton, D.T.	Male	On small Oak at 12:30h (presumed recently hatched)
21/05/2009	Pendleton, T.A. and Pendleton, D.T.	Female	On Hawthorn from late morning till early afternoon, but not seen later.
	Pendleton, T.A. and Pendleton, D.T.	Female	On grass at 14:00h. Relocated by hand to same Hawthorn as above female.
	Binding, A.E. and A.	Female	On grass at 16:35h
23/05/2009	Pendleton, T.A. and Pendleton, D.T.	Female	On grass at 14:45h, then flew to nearby small Oak
24/05/2009	Pendleton, T.A. and Pendleton, D.T.	Female	On grass
	Binding, A.E. and A.	Male	Observed in flight
04/06/2009	Pendleton, T.A. and Pendleton, D.T.	Female	On grass at 15:00h. Proved to have mated and taken into captivity. Released in same locality on June 8th.
08/06/2009	Pendleton, T.A. and Pendleton, D.T. Binding, A.E. and A.	Female	On small Birch, remained until 11/06/2009
11/06/2009	Binding, A.E. and A.	Female	On small Birch
12/06/2009	Pendleton, T.A. and Pendleton, D.T.	Female	On grass at 11:46h
	Pendleton, T.A. and Pendleton, D.T.	Male	On grass at 14:36h
16/05/2010	Pendleton, T.A. and Pendleton, D.T.	Female	Found at 11:35h on small scrub Birch
19/06/2010	Pendleton, T.A. and Pendleton, D.T.	Male	Found at 11:05h resting on young Oak growth from stump cut down the previous Autumn. Later observed feeding on leaves at 12:35h. Weather fairly cool and breezy
23/04/2011	Pendleton, T.A. and Pendleton, D.T.	Male	On grass at 10:20h. The first ever April record of <i>C. coryli</i> from the Sherwood Forest NNR and possibly the earliest ever national record. Relocated on nearby Hawthorn on

			24/04/2011
01/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	Found on a small Oak at 12:05h, but soon became active and flew high to the top of a nearby Birch.
	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branch of large Birch, found at 15:40h. Present again on 02/05/2011.
02/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On Oak growing underneath/through a large Birch, found at 13:15h.
	Pendleton, T.A. and Pendleton, D.T.	Female	Found within a few feet of above female, on lower branch of a large Birch, found at 13:20h.
03/05/2011	Pendleton, T.A. and Pendleton, D.T. and Joynt, G.	Male	12 feet up large Birch at 15:00h
	Pendleton, T.A. and Pendleton, D.T. and Joynt, G.	Female	16 feet up large Birch at 15:00h
	Pendleton, T.A. and Pendleton, D.T. and Joynt, G.	Female	16 feet up large Birch at 15:20h
04/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch at 12:42h.
	Pendleton, T.A. and Pendleton, D.T.	Female	On small Oak at 12:46h.
	Pendleton, T.A. and Pendleton, D.T.	Female	On lower branches (7 feet) of mature Birch at 12:53h
	Pendleton, T.A. and Pendleton, D.T.	Female	On lower branches (9 feet) of mature Birch at 13:15h
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch at 14:00h
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch at 14:00h
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch at 14:00h
	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branches (10 feet) of mature Birch at 14:15h
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch at 14:25h
	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branches (12 feet) of mature Birch at 14:45h
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (22 feet) of mature Birch at 15:00h
05/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On lower branches (7 feet) of mature Birch at 16:35h
	Pendleton, T.A. and Pendleton, D.T.	Female	On lower branches (6 feet) of mature Birch at 16:38h, on same tree as above female
06/05/2011	Pendleton, D.T. and Joynt, G.	Male	On branches (30 feet) of mature Birch at 14:45h, observed mating with female
	Pendleton, D.T. and Joynt, G.	Female	On branches (30 feet) of mature Birch at 14:45h, observed mating with above male
	Pendleton, D.T. and Joynt, G.	Female	On branches (20 feet) of mature Birch at 15:15h
07/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (35 feet) of mature Birch at 13:30h
	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Oak at 13:40h
08/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch at 12:27h. Still present on 12/05/2011.
09/05/2011	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On scrub Birch.
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (35 feet) of mature Birch, in cop with female
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (35 feet) of mature Birch, in cop with male
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (35 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (20 feet) of mature Birch

	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (24 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Female	On branches (20 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T. and Vaughan, M.	Male	On branches (22 feet) of mature Birch
10/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On grass at 12:45h.
11/05/2011	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch, then flew off
12/05/2011	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (15 feet) of mature Birch
13/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch. Still present on 15/05/2011
15/05/2011	Pendleton, T.A. and Pendleton, D.T.	Male	On Rosebay Willowherb stem within grass in overcast weather
	Pendleton, T.A. and Pendleton, D.T.	Female	On dead Rosebay Willowherb stem within grass in overcast weather
16/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On grass in overcast weather, moved to scrub Oak. Killed by a spider on 19/05/2011.
	Pendleton, T.A. and Pendleton, D.T.	Larva	In leaf litter at location of above female
17/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch. Still present on 18/05/2011.
	Pendleton, T.A. and Pendleton, D.T.	Male	On grass in overcast weather. Still present on 18/05/2011.
18/05/2011	Pendleton, T.A. and Pendleton, D.T.	Larva	In leaf litter within small excavated trench
19/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Downy Birch, then flew off unseen
	Pendleton, T.A. and Pendleton, D.T.	Male	On grass, became active and flew high to mature Birch
25/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch. Noted egg-laying.
31/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch.
31/05/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Downy Birch.
02/06/2011	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (40 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (40 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (40 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (35 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (40 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (28 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (28 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (35 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (35 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (40 feet) of mature Birch. On same leaf as another male and a female.
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (40 feet) of mature Birch. On same leaf as another male and mating with female.
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (40 feet) of mature Birch. On same leaf as above two males, mating. with one male.
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch
09/06/2011	Pendleton, T.A. and Pendleton, D.T.	Female	On scrub Birch. This female had slight damage to the elytra and was present on same scrub Birch on 24/06/2011.
17/05/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On grass, presumed recently emerged.
18/05/2012	Pendleton, T.A. and Pendleton, D.T.	Male	On Cow Parsley.

	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branches (5 feet) of semi-mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On scrub Birch.
20/05/2012	Joynt, G.	Female	Low down on Birch trunk.
	Pendleton, T.A. and Pendleton, D.T. and Joynt, G.	Male	On grass
23/05/2012	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch, in cop with female
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch, in cop with male
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (20 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (20 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (20 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (20 feet) of mature Birch
24/05/2012	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (20 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (35 feet) of mature Birch, found in a new area, adjacent to western limit of previously known range
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (35 feet) of mature Birch, found in a new area, adjacent to western limit of previously known range
26/05/2012	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (30 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On grass
	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (25 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On grass. Had severely damaged elytra.
27/05/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (35 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (38 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (38 feet) of mature Birch
28/05/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On branches (38 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On branches (25 feet) of mature Birch
02/06/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On dead Birch twig on grass
18/06/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On grass
19/06/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On small scrub Downy Birch, left uncut from previous Winter
19/06/2012	Pendleton, T.A. and Pendleton, D.T.	Female	On small Oak re-growth
25/06/2012	Joynt, G.	Female	On grass underneath mature Oak and Birch
19/05/2013	Pendleton, T.A. and Pendleton, D.T.	Female	On grass
20/05/2013	Pendleton, T.A. and Pendleton, D.T.	Male	On small scrub Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On flower stem of Cow Parsley
	Pendleton, T.A. and Pendleton, D.T.	Female	On grass. Placed on small Hawthorn and still present on 25/05/13
22/05/2013	Pendleton, T.A. and Pendleton, D.T.	Female	On small scrub Downy Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On small scrub Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On Cow Parsley

	Pendleton, T.A. and Pendleton, D.T.	Female	On small Hawthorn. Still present on 25/05/13
25/05/2013	Pendleton, T.A. and Pendleton, D.T.	Female	On Hawthorn
30/06/2013	Pendleton, T.A. and Brothers, P.	Female	On small scrub Birch
03/05/2014	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branches (7 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On lower branches (8 feet) of mature Birch
	Pendleton, T.A. and Pendleton, D.T.	Male	On small scrub Birch
	Pendleton, T.A. and Pendleton, D.T.	Female	On small scrub Birch

4.2 *Cryptocephalus fulvus* (Goeze, 1777)

A very small species and historically only known from Barrow Hill, Everton in north Nottinghamshire (Chamberlin 1905). *Cryptocephalus fulvus* has a thinly scattered distribution in Nottinghamshire, but it always seems common where it occurs.

It should be expected wherever St John's Wort (*Hypericum sp*) grows in dry locations and the demise of the county's coal industry has almost certainly allowed it to colonise new sites. Many former Colliery sites now probably hold this beetle and sweeping seems to be the most productive method. Since 2009 we have swept adults from St John's Wort growing at Warsop Main Pit Top, Gedling Pit Top, Bevercotes Pit Wood, Nether Langwith Quarry and Attenborough NR.

4.3 *Cryptocephalus labiatus* (Linnaeus, 1761)

Another small *Cryptocephalus*, recorded historically from near Edwinstowe and at Sherwood Forest, also at Barrow Hills, Everton in north Nottinghamshire and from Langford Moor near Newark.

Certainly the most widespread of all Nottinghamshire's *Cryptocephalus* beetles, with most known sites lying on Sherwood Sandstone. Recent records have come from Budby South Forest and Clipstone Old Quarter (both forming part of the Sherwood Forest NNR), Lound Wood at Eakring, Oak Tree Heath and Rainworth Heath near Mansfield, Gamston Wood near Retford and both Warsop Main Pit Top and nearby Warsop Wood. Our own records suggest that *Cryptocephalus labiatus* is most common on Birch scrub (particularly on scattered Birch scrub growing on heathland) but it is occasionally found on Oak, Sallow, Elm and Hazel.

4.4 *Cryptocephalus nitidulus* (Fabricius, 1787)

An RDB1 beetle and long since regarded as being extinct in Nottinghamshire, where it has probably not been seen since the early 1800's. Any Nottinghamshire records of *Cryptocephalus nitidulus*, would have been classed as historical, even when Carr published his book '*The Invertebrate Fauna of Nottinghamshire*' in 1916.

4.5 *Cryptocephalus parvulus* (Müller, O.F., 1776)

A rare *Cryptocephalus* beetle in Nottinghamshire and never recorded historically from the county. There is just a single county record, coming from Bawtry in the very north of Nottinghamshire in 1983 (Skidmore, P.). *Cryptocephalus parvulus* has a patchy UK distribution (it currently has Nationally notable B status) and could potentially occur on Birch at other Nottinghamshire sites. There are no Sherwood Forest records.

4.6 *Cryptocephalus moraei* (Linnaeus, 1758)

An uncommon species in Nottinghamshire and not known to have occurred anywhere in the county historically. We currently know of just three locations where this beetle is found, but many of the former Colliery sites should be capable of holding this species.

It is found on St John's Wort (*Hypericum*) but it took us three visits to Gedling Pit Top in late June and July 2010, before we swept a specimen from a sheltered area there. Regular searches over two years at Warsop Main Pit Top proved unsuccessful until 2011, when adults were discovered in an area that had been previously been regularly searched. Similarly, after spending a fruitless few hours searching for this beetle at Bevercotes Pit Wood in July 2010, we were amazed to find it within five minutes of a search in June 2011, at the same location as that searched in 2010. There are no Sherwood Forest records.

4.7 *Cryptocephalus pusillus* (Fabricius, 1777)

Another small species, usually located by beating or visual searching of deciduous shrubs, or small trees. Some less well-marked specimens of *Cryptocephalus pusillus* could potentially be mistaken for *Cryptocephalus fulvus*. Generally uncommon in Nottinghamshire, with few records or known sites.

Historically known from Sherwood Forest, but recent records have come from Warsop Main Pit Top between 2009 and 2012 (Pendleton, T.A. and Pendleton, D.T.) where it was occasionally found commonly on Alder growing at the bottom of a dry, south-facing slope. Other records and sites include Lady Lea Quarry (Kirby, P.) in 1999, Sherwood Heath SSSI (Godfrey, A.) in 2004 and Gamston Wood in 2011 (Pendleton, T.A. and Pendleton, D.T.), where two males were found on coppiced Hazel (*Corylus avellana*).

4.8 *Cryptocephalus querceti* (Suffrian, 1848)

A very rare *Cryptocephalus* beetle, having RDB2 status and presently known from only a handful of UK sites. In Nottinghamshire, it has only ever been reliably recorded from the Sherwood Forest area and some records listed as 'Sherwood' accessible via the NBN Gateway, are clearly wrong and are shown on the NBN maps as being located in the suburb of Sherwood in Nottingham, rather than Sherwood Forest.

Adult *Cryptocephalus querceti* have a preference for feeding on the epicormic growth on ancient/mature Oaks and are extremely similar to *Cryptocephalus labiatus*. The elytral puncturation is much finer on *querceti*, and although websites and literature often quote *C. querceti* as having completely clear yellow legs, there is usually some darkening of the hind femora. In *C. labiatus*, the rear legs are usually completely dark, with at least some degree of darkening on all other legs. *C. querceti* also appears less short and bulky than *C. labiatus*, even in the field and the females are larger than males.

4.8.1 Recent records of *Cryptocephalus querceti* from Sherwood Forest and the UK

Nationally, *Cryptocephalus querceti* is known from just a handful of sites in the UK, from Sherwood Forest, Windsor Great Park and Donnington Park. There are also records from Chat Moss (Lancashire) and Langford Moor in Nottinghamshire. Sherwood Forest actually has few recent records of *C. querceti*, but it was found during surveys in 1998 (Lott, D.) and then more recently in 2010 (Alexander, K. N. A.) and again in 2011 (Pendleton, T.A. and Pendleton, D.T.). On the other hand, a targeted survey to find the beetle in 1999 provided completely negative results.

We had made numerous efforts to find *C. querceti* since 2009, but had failed to find it in any of the brief searches made within the confines of the Sherwood Forest Country Park and despite regular site visits. But by using the interactive maps provided on the NBN website, we were eventually able to successfully target our search in 2011, to some old Oaks at Clipstone Old Quarter - one of the two of the areas where it had previously been recorded. All our records are listed in the following table.

Table 01. All *Cryptocephalus querceti* records from 2011

Date	Observer/recorder	Sex	Location on tree/vegetation	Under-storey flora/habitat	Situation
28/05/2011	Pendleton, T.A. and D.T.	Male	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Open
	Pendleton, T.A. and D.T.	Male	On lower branches of semi-mature Oak	Bracken/leaf litter	Open
	Pendleton, T.A. and D.T.	Female	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered
	Pendleton, T.A. and D.T.	Female	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered
	Pendleton, T.A. and D.T.	Female	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered
29/05/2011	Pendleton, T.A. and D.T.	Female	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered
02/06/2011	Pendleton, T.A. and D.T.	Male	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered
	Pendleton, T.A. and D.T.	Female	On lower branches of ancient Oak	Grass and Bracken/leaf litter	Sheltered

Recent work to restore much of the Country Park area to wood pasture, by attempting to control Bracken by annually using herbicide and over-grazing by large Herbivores, may ultimately prove to be detrimental and limiting to the continued presence of *C. querceti*. We found that it prefers Oaks growing in warm, sheltered locations and given some protection from prevailing winds by the close proximity of other mature/semi-mature trees.

We have not yet been able to devote more time in our search to try and provide more accurate picture of *C.*

querceti's range across suitable areas within the Sherwood Forest NNR, but can say that its range is extremely restricted at present.

4.8.2 Further notes on the records of *Cryptocephalus querceti* at Sherwood Forest in 2011

Finding *C. querceti* actually proved to be quite easy, when compared to some species we have deliberately looked for here.

Despite the very windy and eventually wet conditions on the morning of May 28th 2011, it took just over an hour of visual searching to be successful in finding a single male. Visual searching of suitable sites (although not quick) is the best method of finding most of the species we have looked for and the technique employed to find *querceti*, was to stand underneath the lower branches of an ancient Oak and look up to search for the beetle in silhouette on the leaf against the sunlight, or heavy rain in this instance.



In the field, this beetle showed immediate differences to a male *C. labiatus*, even to the unaided eye. There was an appreciable difference in size based on our own experiences of male *C. labiatus*, and *C. querceti* appeared slightly longer, less dumpy looking and also slightly longer-legged.

A hand lens also showed that the elytral punctures on *C. querceti* were noticeably finer than on *C. labiatus*. The differences in the elytral puncturation between female *Cryptocephalus querceti* and *Cryptocephalus labiatus*, are clearly shown in photographs at <http://www.eakringbirds.com/eakringbirds4/cryptocephalusquerceti.htm>, with *C. querceti* showing the much finer elytral puncturation of the two species. Leg colour was a slightly more difficult matter that gave us cause for concern and additional confusion was added by repeated internet-based references to *C. querceti* having completely yellow legs, when in truth there is usually a dark patch on the rear femora of *C. querceti*.

We subsequently recorded another male and three females on our return visit to Clipstone Old Quarter later that same afternoon and it is interesting to note that two of the three females were found on the same branch of one particular Oak, growing in probably the most sheltered location in the compartment. An additional female was found on the same branch the next day (May 29th) and both male and female were later found on June 2nd.

4.8.3 *Cryptocephalus querceti* habitat at Clipstone Old Quarter, Sherwood Forest

To find a total of six adults on a weekend when the weather conditions were relatively poor, was especially pleasing. Although at this still very early stage in our recording and study of *C. querceti*, we feel it important that some mention of the immediate habitat is made.





The preceding four photographs, show the habitat and locations of the six adult *Cryptocephalus querceti* recorded at Clipstone Old Quarter. These photographs were taken within one of the two compartments of the area, in which we were able to search on May 28th and 29th 2011 and in which adults were found.

The lower left hand photograph on the preceding page, shows the ancient Oak on which we found the first male. This was on the lowest branch visible, bottom right of the tree. A surprising second record came from the semi-mature Oak in the lower right photograph of the preceding page.

The two common factors to the locations in which *C. querceti* were recorded, were that they were all found on low branches with a generally south-facing aspect and on trees that had some grass growing underneath the outer branches. No adults were found on true, young epicormic growth on the trunks, but new off shoots on low branches did produce records.

4.8.4 *Cryptocephalus querceti* egg laying and pot production

Identification of the adults we took home was possible from the many photographs we obtained, but we did keep two males and two females for captive breeding purposes, before releasing them back at the site of capture.

As with most *Cryptocephalus* species, pairing occurred very easily and the first pots were produced on May 29th. Female *querceti* are much more articulate in pot construction than the much larger *C. coryli*, holding the pot in the rear metatarsi and continuously turning the pot with great dexterity during the latter stages of construction.

The 0.5mm long pot of *C. querceti* (below left) is very similar to that produced by *C. labiatus* (below right). The pots of both species' are broadly oval and with the same twisted texture to the surface. But a strange difference between the two species is that the twists produced by *C. querceti* females go from left to right, whilst those produced by *C. labiatus* females go from right to left. All pots produced by each female showed this characteristic.



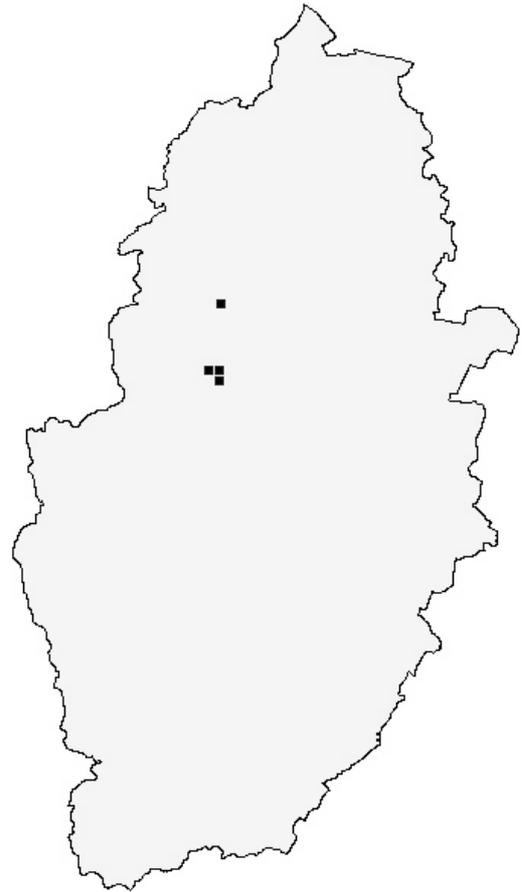
5.0 Nottinghamshire distribution maps

The distribution maps are built from the records of the following list of recorders.

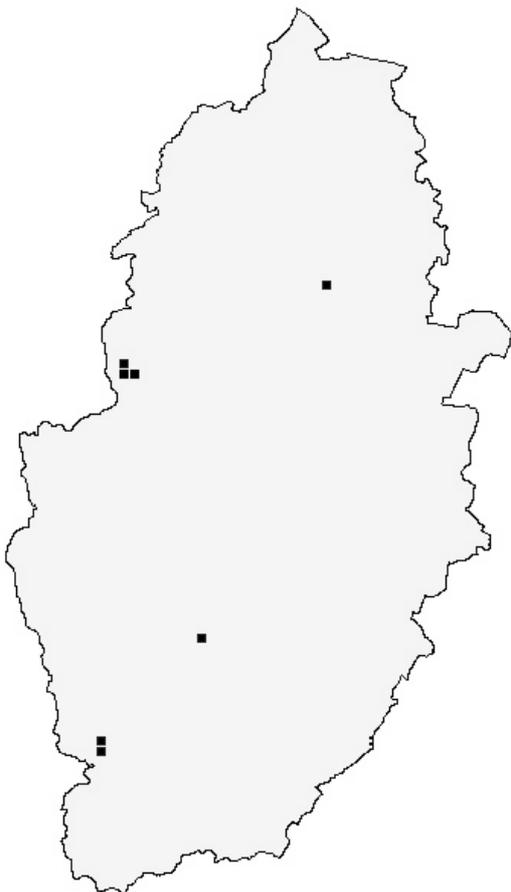
A. and A.E. Binding
K.N.A. Alexander
D. Lott
A. Godfrey
P. Skidmore
T.A. and D.T. Pendleton.
G. Joynt.
M. Vaughan
P. Brothers

We have avoided using any historical records sourced from J.W. Carr's book '*The Invertebrate Fauna of Nottinghamshire*' within these maps. Carr only had records of *Cryptocephalus coryli*, *C. fulvus*, *C. labiatus* and *C. querceti* for Nottinghamshire.

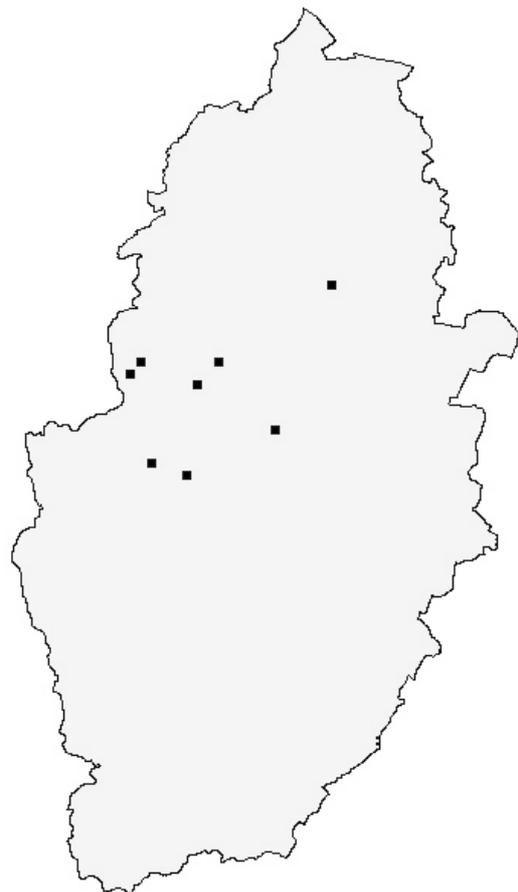
Cryptocephalus coryli



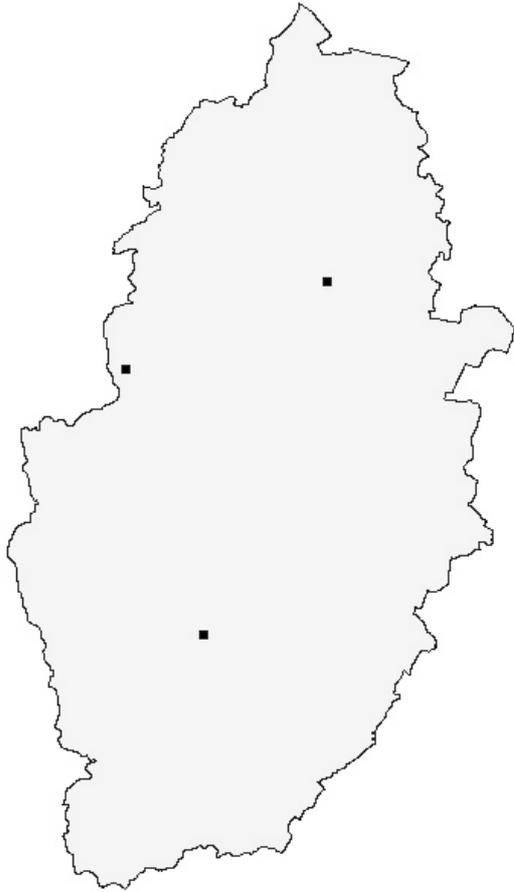
Cryptocephalus fulvus



Cryptocephalus labiatus



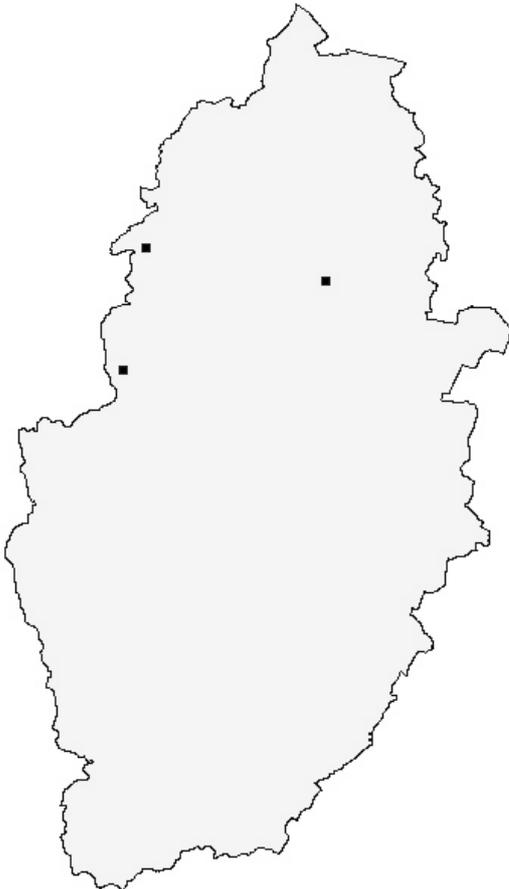
Cryptocephalus moraei



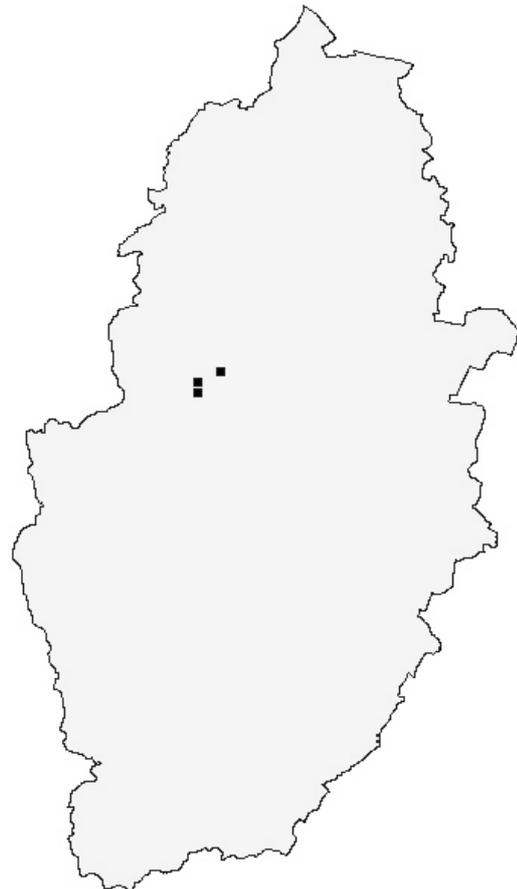
Cryptocephalus parvulus



Cryptocephalus pusillus



Cryptocephalus querceti



6.0 Nottinghamshire's *Cryptocephalus* beetles



Cryptocephalus coryli female (above left) and male (above right)



Cryptocephalus fulvus



Cryptocephalus labiatus



Cryptocephalus moraei



Cryptocephalus parvulus



***Cryptocephalus pusillus* male (above left) and female (above right)**



Cryptocephalus querceti

Below are the typical habitats of *Cryptocephalus fulvus*, *C. moraei*, *C. labiatus* and *C. pusillus* in Nottinghamshire.

All our native *Cryptocephalus* beetles are sun-loving species, preferring sites which are sheltered from strong prevailing winds. South-facing locations are favoured.

Both *C. fulvus* and *C. moraei* are likely to be present at dry, often post industrial sites, where *Hypericum* sp grows. The habitat illustrated is a sheltered area of the former Warsop Main Colliery, where both *C. labiatus* and *C. pusillus* are present.

C. labiatus and *C. pusillus* also favour lowland heath and deciduous woodland, showing a preference for scrub Birch or coppiced Hazel growing along the edge of woodland rides.



***Cryptocephalus fulvus* and *C. moraei* habitat**



***Cryptocephalus labiatus* and *C. pusillus* habitat**

7.0 Appendices

Appendix 7.1 Successful surveying techniques for *Cryptocephalus coryli*

Visual searching of Birch foliage and ground flora, has always been the most productive method of surveying, but 2011 saw us greatly increase our understanding of *C. coryli* and several new discoveries on the beetle's habits were made. The most important of these was the discovery that adult *C. coryli* actually spend most of their adult life in the tree canopy and are distinctly more arboreal than previously thought. This could offer a likely explanation for the poor numbers recorded from Sherwood Forest CP in 2010 and the lack of records coming from other UK sites in recent years.

The arboreal tendencies of *C. coryli* led us to make changes to our own survey techniques. Based on our own research, the preferred tree of choice is Birch. Tree location/situation, branches and foliage type favoured, is distinct once learnt and can potentially be used by experienced surveyors to narrow down the most productive areas of a site to survey.

Our usual method of visually searching the foliage of Birch scrub and ground flora, meant that we had to incorporate the use of optical equipment in order to visually survey mature trees. Conducting surveys of a site's larger Birches from the ground using binoculars and a telescope, will usually soon reveal if *C. coryli* is on site. Although it is sometimes a slow and painstaking method, suitable Birch trees should be scanned several times with binoculars on sunny, windless days, when adult *C. coryli* sit openly on the upper side of the leaf, usually along the mid-rib. Any possible candidates for *C. coryli*, can then be confirmed by telescope.

At height, the only likely confusion species at Sherwood Forest, is the Weevil *Attelabus nitens*. Usually found on Oak, early emerging *A. nitens* adults can sometimes be present on Birch, especially if there have been late ground frosts, which blacken the opening foliage of Oak in early May. The Ladybirds *Coccinella septempunctata* and *Harmonia axyridis* are other (less likely) candidates for ID confusion.

Perhaps the ultimate and most unique method of surveying, is the employment of a Cherry Picker. In May 2011, we were offered the use of one free of charge, by WKW Tree Services and it proved to be an extremely useful tool. The following edited account is taken from the www.eakringbirds.com website.



On May 9th 2011, we were able to conduct a rather unique survey with the very kind help of WKW Tree Services. The survey was based at tree top height, using a cherry picker operated by the extremely willing and very helpful Matt Vaughan. At the end of six hours, a total of 14 *C. coryli* had been located, which was a new site record total despite the increasingly windy conditions on the day.

All but one were found at the very tops of mature Birches lining the southern edge of the favoured plantation and included a mating pair. With the wind being so gusty at times, all of the beetles were slightly down the Birch stems, clinging tightly to the stems in the manner we had noted recently at lower levels, when conditions are similar.

We began our survey at the most northerly location *Cryptocephalus coryli* have been found since 2008. Searches were made of mature Birch trees in the most promising locations (generally south facing and sheltered) and up to the maximum height we could go, which was about 15 metres. Much depended on the state of the trees themselves. We had noticed earlier in the month, that there were favoured branches and possibly favoured trees, where two and sometimes three adults could be seen using binoculars and a telescope from the ground. Although there was evidence to support this through the survey, similar work really needs to be done on a number of dates and in more suitable weather conditions to produce any real confirmation.

Despite not being touched by early May's frost, the very dry Spring weather of 2011 had an effect on many of Sherwood's Birches, with the leaves being small, deformed and the amount of foliage on some trees being

distinctly thin. Trees showing much thicker foliage were the ones which most often produced *C. coryli*. Favoured trees producing beetles were often slightly smaller and younger.



Searching for *C. coryli* in the conditions we had was difficult. The desired plan of being able to use binoculars to scan the upper levels of the trees from height, soon having to be abandoned in favour of a much closer inspection within suitable branches of foliage that we were able to physically reach, or see well enough with the unaided eye. One of the problems we had even with this method though, was that one minute you were more or less in the tree working through the thinner branches, then the next it was over ten feet away in the wind.

The first 100 metres of favourable looking trees along the compartment edge we searched, had provided nothing on this occasion, although in previous years we had had several *coryli* records from along this stretch at ground-level.

It took a while to find our first *C. coryli* of the day, when two females and a male were located on a section of Birch overhanging the path. Immediately across the path, another Birch produced a mating pair with an additional male very close by, but all on the same branch where the foliage was quite dense and of good quality.

Both trees that produced our first *C. coryli* were slightly smaller than the largest of the Birches in this area. The location of the trees where the first *C. coryli* were found, more or less matched where we had seen *coryli* at both ground level on scrub Birch and Oak, and at the tops of Birches using binoculars. This began to give us an indication that there may indeed be favoured (key) trees that the adults tend to use, but whether this is through location (in view of shelter and a southerly aspect) or a better quality food source is not completely understood at this time.

Appendix 7.2 Rearing *Cryptocephalus* beetles in captivity

All adult *Cryptocephalus* beetles will mate and produce eggs/pots readily, even in the most rudimentary of containers. Large species such as *Cryptocephalus coryli*, are best housed in plastic buckets, with a small access door cut in the side and the top securely netted over with fine black netting. Place a small jar of water at the bottom of the bucket, fill with water and (depending on species) provide some fresh foodplant for the adults. We have found that lightly spraying the bucket with tepid water early each morning is a necessity, as *Cryptocephalus* beetles can become dehydrated and die extremely quickly. The bucket should be kept in a sunny place, but given some shade occasionally throughout the hottest part of the day and taken indoors overnight.



The captive rearing of *Cryptocephalus* larvae is a relatively easy process and any successful attempt at rearing, is best achieved by maintaining conditions as near as possible, to the correct habitat for the species being reared.

Avoid the temptation to rear indoors under higher temperatures, as we have found that this will result in forcing the larvae to pupate too quickly, resulting in poor quality adult stock. Larvae are best reared outside, in a warm shady location and protected at all times from extreme weather conditions. Heavy rain can easily result in loss of larvae, through flooding of the container and high Summer temperatures are further increased by the sides and lid of the plastic container.

No substrate is necessary for the adults, but maintain a supply of fresh food regularly and remove any eggs/pots produced to a smaller container, where they can be observed more easily. Pots should be kept largely dry, but sprayed with water once a week and kept well ventilated to prevent fungal growth. After two or three weeks, the larvae will emerge (usually after being sprayed with water) and can now be transferred to their rearing container.

Cryptocephalus larvae do well when kept at high density and provided food is plentiful. Rearing is best achieved in plastic containers with numerous holes drilled through both the base (for drainage) and lid (for ventilation). We use containers measuring 30cm x 20cm, with a depth of 10cm and cover the container with fine netting during the Summer months, but cover the whole set up from rain.

Especially important is the substrate, which ideally should be the same as found at the site of collection. Sieve the substrate to eliminate any potential invertebrate predators and to produce a fine substrate. A 5-10cm layer of substrate is ideal, but firm the substrate well to eliminate the chance of shrinkage away from the container sides, if it dries out too much. It is not necessary to keep the substrate continuously damp, but spray both foodplant, substrate and larvae weekly with tepid water. Provide both stems and leaves of foodplant for the larvae, not just leaves.

Most *Cryptocephalus* larvae stop feeding surprisingly early in the Summer. This is usually from around late July or early August. By this time, most larvae will be about half-grown and once all feeding has stopped, any remaining foodplant can be removed before it starts to become mouldy. Keep the set-up fairly dry over the Winter months, spraying only very occasionally. Move the container into a shed or dry outbuilding for the Winter and keep well ventilated by leaving the netting over the top of the container. Larval pots will usually develop some mould growth at some point, so check regularly.

The first warm days of early Spring, will see the resumption of larval activity, so begin to feed and care as through the previous year. By late Summer, larval feeding will have stopped and the pots will be sealed. Over-winter care, should be the same as for the previous Winter, but once the weather warms up the following late March or early April, begin to check daily for the emergence of adults.

The following extract is from <http://www.eakringbirds.com/eakringbirds6/cryptocephaluscorylibreeding.htm>, detailing the emergence and later release of our 2014 captive stock of *Cryptocephalus coryli*.

Adult emergence was largely restricted to a period of about two weeks from April 26th and was virtually complete by May 12th. We were extremely pleased with the eventual emergence success rate of 82%, which equated to just over 1,000 adults. After single males emerged on April 26th and 27th, two males emerged on April 28th, before 24 adults (including the first five females) appeared on April 29th. The largest number to emerge on a single day was 156 on April 30th. Numbers of emerging adults steadily declined afterwards, although another 126 adults emerged on May 3rd.

The peak time of day for emergence was found to be early afternoon, but beetles would emerge from first light and sometimes continue into the late evening. Light and probably temperature, seemed to induce emergence and artificial light after a period of natural darkness, would see continued emergence into the early morning hours.

The release of nearly 1,000 Hazel Pot Beetles took place at the Sherwood Forest Country Park on May 12th 2014. The location of release was within the boundaries of the existing colony, which we had rediscovered after a 70 year absence back in 2008 and from where the parents of this released stock originated from.

The release will help augment the Sherwood Forest colony, from which eggs were originally obtained in 2011 and the resulting adults bred from in 2012. We have retained several thousand eggs for continued breeding purposes and further release, which should emerge as adults in Spring 2016.

Citation for this publication:

Pendleton, T.A. and Pendleton, D.T. The current status and distribution of *Cryptocephalus coryli* and Nottinghamshire's other *Cryptocephalus* beetles. (www.eakringbirds.com) December 2015.

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