Discovery of a New Barbastelle Colony in the Chiddingfold Forest Complex, Surrey

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Introduction

Until 2019 the Surrey Bat Group database had no records of breeding roosts of barbastelle *Barbastella barbastellus* in the county. For many years the Bat Group has suspected that at least one breeding colony must be present, but work done to date has failed to find any evidence to support this theory.

While working on a small *Myotis* woodland bat project with the Bat Conservation Research Unit, the Bat Group gathered more records for barbastelles in the county, so for the 2019 survey season a licence was obtained from Natural England (number 2019-38922-SCI-SCI) to permit Ross Baker and Lynn Whitfield to fit radio tags to any female or juvenile barbastelles captured. In May 2019 two female barbastelles were caught and radio tracked. The first, from Wanborough Wood near Guildford, was tracked back as far as Witley, but the tag expired before the roost was found. The second was caught at Peartree Hanger in Chiddingfold Forest (OS grid reference SU991336), and was tracked back to a roost in Durfold Wood (grid square SU9832). A total of 14 bats were filmed emerging from a feature in a dead oak tree, indicating the presence of a small maternity roost. Full details can be found in the Surrey Bat Group summer newsletter (Whitfield, 2019).

This report presents the results of further radio tracking studies carried out in the Chiddingfold Forest area later the same year.

Methods

The Bat Group returned to Durfold Wood on 7th August 2019 and set up two Austbat harp traps (Faunatech, Australia), one two-bank and one three-bank, each with an AT100 ultrasonic lure (Binary Acoustics, USA), in the woodland understorey, one 9m net (Ecotone, Poland) across one of the main woodland trails and a 3m net across one of the side trails. A 0.29g radio tag (Lotek, UK) was glued between the shoulder blades of bats to be radio tracked using medical grade latex adhesive (Torbot, USA) (Figure 1). The bats were tracked using three-element Yagi antennas and TRX1000 receivers (Wildlife Materials, USA).
When roost sites were located, emergence surveys were carried out from 30 min before sunset to at least 15 minutes after the last bat emerged, using Canon XA10 or XA20 video cameras with supplementary infrared lighting to view emergence. Acoustic bat detectors (Elekon Batlogger M or Batbox XD time expansion/frequency division detector connected to a Roland R-05 digital recorder) were set up near the roost trees to record bat calls during the surveys. All bat call sequences recorded were analysed using appropriate software (Elekon BatExplorer/Cool Edit) to check species identification.

Figure 1: Radio tag fitted to barbastelle.

Results

At 23.20 on 7th August a post-lactating female barbastelle weighing 9.5g was caught in the 9m net and 5 minutes later another weighing 10.0g was caught in the same net. Both bats were caught in the north side of the net, implying that they had been heading south. The first bat was fitted with a tag broadcasting at 173.842mHz and the second bat with a tag broadcasting at 173.744mHz. Throughout this report they are referred to as bat 842 and bat 744 respectively. Full details of all roosts identified have been submitted to the Bat Tree Habitat Key database[1] and are summarised in Table 1.

Table 1: Summary of roost tree features*.

Tree ref.	*Tree alive/ dead*	*Tree height (m)*	*DBH (cm)*	*Roost aspect*	*Roost height (m)*	*DRH (cm)*	*Distance to edge of wood (m)*
TW1	Dead	12	24	Mainly E and SE	Lower 3, upper 4-4.5	24	76
TW2	Alive	12	38	NE	3	28	105
TW3	Dead	12	33	NE	4	22	92
MC1	Dead	16	64	?	?	?	51
MC2	Dead	18	49	?	?	?	39
MC3	Dead	10	39	W and ?	3	39	33
MC4a	Alive	Exact tree uncertain - one of small group close to tree 4b					
MC4b	Dead	14	42	NE	6 (also uncertain area higher up)	42	0

*Heights and diameter at roost height (DRH) estimated by eye from the ground. DBH - diameter at breast height.

[1] http://battreehabitatkey.co.uk/

Bat 842

The day after trapping bat 842 could not be found during the day, or at emergence time, nor could it be found during a daytime search on 9th August. However it was picked up foraging around the south of Tugley Wood (to the north of the capture site) in the evening. During a daytime search on 10th August the bat was located to a dead pedunculate oak *Quercus robur* in Tugley Wood West (grid square SU9733) (tree ref. TW1: see Figure 2). A minimum of 16 bats were filmed emerging from behind lifted bark between 20.58 and 21.17.

The following day bat 842 had moved to a live pedunculate oak in Tugley Wood West, grid square SU9734 (tree ref. TW2: see Figure 3), where it was found to be roosting in a shearing crack. Accurate filming of the emergence was made difficult by the surrounding vegetation, but a minimum of 19 bats were filmed emerging, the first at 20.49. However, it was still in the same feature within TW2 the next day (12th August) and with the camera in a better position it was possible to get a good view of 21 bats emerging between 20.54 and 21.22.

Figure 2: Tree TW1 (distant and close up) with the two roost features arrowed.

Figure 3: Tree TW2 with roost feature shown in summer (left) and winter.

On 13th August bat 842 was found back in tree TW1, where it remained for a total of five days. On the night of 14th August bad weather prevented filming but attempts were made

to film the emergence on all other nights. Filming was difficult as the bats were usually under two separate sections of lifted bark and the maximum that could be filmed emerging on any one night was seven on 15th August.

On 18th August the bat had moved again to a new roost in Tugley Wood West (grid square TQ9733) (tree ref. TW3: see Figure 4), which was also a dead pedunculate oak in an area where pine clearance appeared to have been recently undertaken. The bats emerged from a feature likely to be a lightning strike enlarged by a woodpecker/grey squirrel, forming a round hole in the bark. During filming on 18th and 19th August the emergence of 22 and 21 bats respectively was recorded.

Figure 4: Tree TW3 with roost exit arrowed.

Bat 744

The day after capture bat 744 and was found to be roosting behind a sheet of lifted bark in a dead pedunculate oak (tree ref. MC1: Figure 5) in Manorhill Copse (grid square SU9732), to the south-west of Durfold Wood. The roost was not located until late in the day and there was no time to obtain permission to do further work in this privately owned wood.

By the following day, 9th August, bat 744 had moved to a different dead pedunculate oak within the same grid square in Manorhill Copse (tree ref. MC2: Figure 6). It was still there on 10th August but surrounding vegetation made it impossible to identify the roost feature with certainty or to film the emergence clearly. Only six bats could be confirmed emerging between 20.56 and 21.06, but there were certainly more present. A daytime check on 11th August revealed that the bat had moved again to another dead pedunculate oak in Manorhill Copse, but still in SU9732 (tree ref. MC3: Figure 7) where it was found roosting beneath lifted bark. Again there were problems with the camera setup and surrounding holly *Ilex aquifolium,* and only 10 bats could be confirmed emerging. However, there were

Figures 5 and 6: Trees MC1 and MC2: the exact roost locations were not identified.

definitely more bats present. The bat was in the same feature within MC3 the next day and with a better camera setup it was possible to get a good view of 25 bats emerging between 20.42 and 21.25, and a further bat was filmed within the roost but failed to emerge, making a total of 26.

Figure 7: Tree MC3 in summer (left) and in winter. The fallen bark plate that had formed the roost site is circled.

On 13th August the bat could not be located during the day and was not picked up foraging in the area during the evening, and on 14th August bad weather prevented fieldwork both day and night. However, on 15th August bat 744 was found to be back in tree MC3 and the cameras were duly deployed to film emergence, but the bats had moved higher up the tree and the exact emergence point could not be located. The bat was still in the same tree the next day, but bad weather prevented filming that evening.

During a visit to the site on 7th January 2020 it was found that the bark plate that formed the roost filmed on 12th August had fallen off – see Figure 7.

The bat disappeared again on 17th August and, despite bringing in another surveyor to cover the countryside to the south, no signal was detected. On 18th August it was back in tree MC3 but a prior commitment meant filming that night was not possible. On 19th August the bat had moved to a new roost somewhere in a cluster of two live and one dead pedunculate oaks on the edge of Manorhill Copse (grid square SU9632) (tree group ref. MC4: Figure 8). An attempt was made to film emergence that evening but the results were inconclusive, although the bats appeared to be in one of the live oaks. The last fieldwork took place on 21st August when the bat was still in the same clump, but this time it was clear that the signal was coming from the dead oak and 23 bats were filmed emerging from behind lifted bark. However, long after all the bats seemed to have emerged a signal was still coming from the tree, so it was assumed the tag had been groomed off.

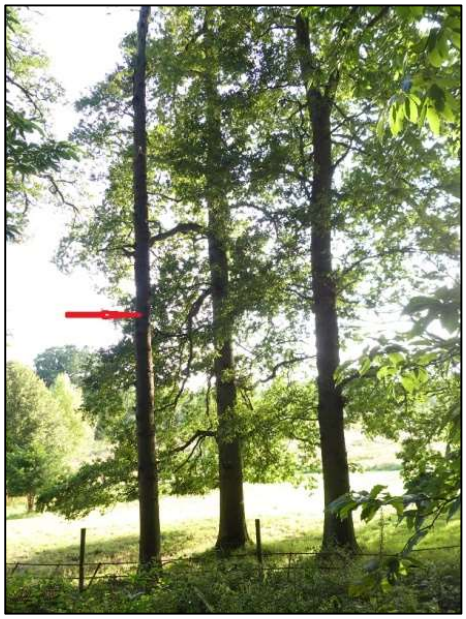

Figure 8: Tree group MC4 with identified roost location arrowed.

Discussion

The radio tracking work on both the Durfold Wood roost in May 2019 and the roosts described above concentrated on finding and describing roosts and filming emergence in order to obtain accurate counts. On one evening in May an attempt was made to follow the bat from the Durfold Wood roost. As on previous evenings, it headed north on leaving the roost, but contact with it was lost to the south of Dunsfold around 21.51. Bat 842 generally seemed to forage in the fields and woodland edges to the immediate west of Tugley Wood following emergence. Some time was spent following it on the 17th August and between 20.40 and 21.25 it was in this area, venturing as far west as the boundary of Chiddingfold Golf Club (grid square SU9534), but by 22.26 it was further south, in the vicinity of Little Haymans farm (grid square SU9731), and by 22.46 it had worked its way around to the west, broadly along the line of the Sussex border path.

In Frank Greenaway's 2008 report (Greenaway, 2008) he describes how the sub-groups of the colony in Ebernoe, Sussex would overlap with one another and that bats would move between sub-groups, but that the colonies from Ebernoe and the Mens maintained a strict separation between each other. The fact that both of the bats in the present study were caught in the same mist net within minutes of each other, and that bat 842's foraging range on 17th August included Manorhill Copse, suggests that the two sets of roosts monitored comprised sub-groups of the same colony.

The count on 12th August was significant as a full emergence count was obtained from both groups simultaneously, with 26 bats at Manorhill Copse and 21 at Tugley Wood. These counts would have included newly volant young and so the number of breeding females present is uncertain, but this does provide a minimum count of 47 bats within the two sub-groups at this time.

During the 2008 study some of the bats were tracked to Tugley Wood, Peartree Hanger and Manorhill Copse, although the fixes there did not form part of the core foraging area for any of the tracked bats. However, given the unwillingness of bats from different colonies to trespass onto neighbouring territories, questions arise about the relationship of the Chiddingfold bats to Ebernoe. Are these two newly discovered sub-groups part of the Ebernoe colony, has the Ebernoe colony fractured, or is this a new separate colony? At their closest the distance from tree MC3 to Ebernoe is only 4.1km and so some sort of link between the two is quite likely. Bat 744 disappeared entirely for two nights during the tracking period, despite an extensive daytime search of the immediate area.

Management Recommendations

On the whole, Manorhill Copse, Tugley Wood and Durfold Wood (the last two managed by the Forestry Commission and the Woodland Trust respectively) appear to be being sympathetically managed for bats. All three sites consequently have a considerable amount of standing dead wood. There are some problems with rhododendron (*Rhododendron ponticum*) encroachment in Manorhill Copse and there are signs that this has been successfully suppressed in the past, but a further programme of removal and stump treatment would be desirable, particularly in the vicinity of tree MC3. All UK barbastelle research papers (e.g. Greenaway, 2008; Carr, 2018) call for a minimum intervention approach in order to achieve old growth semi-natural broad-leaved woodland, but where conversion from plantation is in progress, as for example in Tugley Wood, greater intervention is likely to be necessary. A large area of Tugley Wood, particularly in the vicinity of tree TW3, appears to have been cleared of pine and left to regenerate, but much of the regenerating vegetation is young pine and this should be removed if possible. Given the ephemeral nature of many of the roosts used by barbastelles it is important that there is a regular succession of oaks, including dying trees. Theoretically new trees will grow through thorny scrub that grows around fallen trees but there is limited evidence of this taking place at the moment and so some additional planting may be required in order to achieve the desired mix along with some deer protection and/or control.

In Sussex wider area enhancements were implemented, for example at Butcherlands fields near Ebernoe where flightlines were improved and arable conversion implemented by Sussex Wildlife Trust. This is thought to have resulted in significant benefits to the Ebernoe

colony and reduced the distance bats were travelling each night in order to reach optimal feeding areas (Greenaway, 2008). The Chiddingfold Forest area forms part of the LW01 Low Weald Biodiversity Opportunity Area identified by the Surrey Nature Partnership (Surrey Nature Partnership, 2015) and so it may be possible to use this as a tool to drive similar beneficial change in the areas surrounding these newly discovered roosts.

However, at present there are a number of potential threats to the habitat surrounding the colony as within the 6km core sustenance zone there is currently an application to drill an exploratory oil well under consideration, Waverley Council has approved a major development of just under 2000 homes, plus associated infrastructure, in a new "Garden Village" at Dunsfold Aerodrome, and the Wey and Arun Canal Trust have ambitious plans to restore a long defunct canal that runs through ancient woodland to the south of the aerodrome.

Acknowledgements
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References

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