

## **Brown Hairstreak monitoring guidance**

### **Introduction**

**Current state of play:** Brown Hairstreak is currently monitored at a scatter of sites either by adult transect counts or by intensive egg counts following varying methodologies. Brown Hairstreak is seen too infrequently on butterfly transects to make adult counts a best practice measure of abundance, whilst the current scatter of egg counts with existing methods are not on a sufficient scale to be representative and the methods too time consuming to have wide appeal. We want to encourage new recorders to take part in Brown Hairstreak monitoring to achieve wider coverage and for this a standardised, reduced effort method is required.

**Aim of monitoring:** To generate unbiased trends in the abundance of Brown Hairstreak at country-level and UK scales.

**Objective of monitoring:** This can be achieved by establishing a network of egg counts along fixed routes to be sampled annually, with the locations being spread throughout the species range and fully representative in terms of habitat type and quality.

An annual index of abundance will be derived from the egg count for each route using three key parameters: (1) number of eggs counted (2) search time (in minutes) and (3) the amount of suitable habitat (as a % of the total route length). In addition, knowing the fixed route length, which will remain constant, is also important.

Each route should be sampled once per year and take between 30 minutes and two hours to complete, depending on habitat quality. The survey duration equates to between 30m and 100m of suitable habitat being sampled per transect, based on a mean search time of 1 minute per metre of suitable habitat and allowing for breaks and walking between areas of suitable and unsuitable habitat.

Recorders should set up at least one egg count route on a site in good quality habitat, whilst optional additional transects in medium/low quality/potential habitat can be established and will be extremely valuable in making the network representative and capable of detecting change. For example, if we only establish transects in good quality habitat where the carrying capacity to support Brown Hairstreak has been reached, we will only be able to detect stable or declining trends!

It will not be possible to describe site trends through this quicker method, or make detailed inferences on management effects. This former is best dealt with by more intensive monitoring along the lines already being carried out locally, whilst the latter requires detailed research.

## Setting up monitoring

Obtain grid reference location details from your local [BC Branch BNM co-ordinator](#) of a site supporting Brown Hairstreak which has public or arranged access that is likely to continue for the foreseeable future.

The site will either be a farm, woodland and/or scrubby grassland (see Box 1 below for details).

### Box 1. Brown Hairstreak Habitats

1. Scrub (suitable Blackthorn, mainly suckers)
2. Hedgerow with suckering growth in field margin
3. Hedgerow without suckering growth in field margin
4. Field corners (suitable Blackthorn, mainly suckers)
5. Woodland rides (suitable Blackthorn, mainly suckers)
6. Woodland edges (suitable Blackthorn hedgerows or suckers)

The site may contain one or more of the following hedgerow type (see <http://www.hedgeline.org.uk/photos-hedgerow-types.htm> for detailed descriptions)

1. Green Lanes
2. Remnant or relict hedges
3. Devon and Cornish hedges
4. Tall hedges
5. Classic shrubby hedges
6. Gappy hedges
7. Single species hedges
8. Species-rich hedges
9. Not applicable (not a hedge)

Carry out an initial survey to get a broad indication of Brown Hairstreak distribution within 0.5-1km of the grid reference. This may involve a combination of assessments of hedgerow suitability, searches for eggs and making observations of adult activity during the summer flight season to gain knowledge of the presence of any master trees in the area (which may act as hotspots for adult males).

Aim to establish at least one egg count route at the site, though 2-4 routes would be far more beneficial. Transects will vary in length depending on local factors and habitat quality.

Establish transects in areas where Blackthorn is unlikely to be deliberately removed and where access is likely to be available on a long-term basis.

The top priority is to set up an egg count route in good quality habitat for Brown Hairstreak (if it is present) containing frequent to abundant new growth or suckering growth of Blackthorn that does not have a northerly aspect.

If you have time, establish additional transects to sample any variation in habitat type and quality that may occur on the site. For example, your second egg count route might be a hedgerow of medium (rather than high) quality, your third egg count route of high quality but

on a different aspect and a fourth along a nearby woodland ride containing patches of Blackthorn in suitable condition. Distance to woodland, distance to master trees (in wooded areas) and degree of shelter may also affect habitat quality and therefore would be other suitable egg count route types.

Definitions of habitat quality for hedgerows are given in the Table 1 below.

<b>High quality habitat</b>	> 20% blackthorn in hedge or on suckers in front of hedge, of which frequent (> 25%) young (< 3 years old) growth, not flailed recently or not significantly damaged by flailing or stock browsing.
<b>Medium quality habitat</b>	>20% blackthorn in hedge, of which only occasional, rare or no (< 25%) young (< 3 years old) growth, significantly damaged by recent flailing or stock browsing, or too old and leggy. Occasional, rare or no suckers in front of hedge, or suckers significantly damaged by flailing or stock browsing.
<b>Low quality habitat</b>	5-20% blackthorn in hedge
<b>Unsuitable habitat</b>	<5% blackthorn in hedge

If hedgerows, woodland rides and edges are short (<200m long) an egg count route should cover the whole length. If the habitat is more extensive than this, establish a longer route dependent on the amount of Blackthorn in suitable condition. Ideally, a good quality hedge will contain in excess of 100m of Blackthorn in suitable condition and consequently a two hour survey will be possible, whilst a low/medium quality habitat will ideally contain more than 30m of suitable condition habitat allowing a survey lasting at least half an hour. In scrubby grasslands, a similar principal applies in that you are aiming to sample ~100m<sup>2</sup> of Blackthorn in suitable condition over a two hour period in good quality habitats and at least 30m<sup>2</sup> of habitat in suitable condition sampled in half an hour in low/medium quality habitats.

In scrubby habitats, establish a zigzag egg count route that thoroughly and evenly samples the habitat. The egg count route should pass through areas of both low and high quality Blackthorn-rich scrub with fresh growth and suckers. Make sure that there are cross-referencing landmarks to act as reference points, so that the same route can be easily found and walked in future years.

A definition of **suitable condition** is given in Box 2.

**Box 2. Blackthorn in suitable condition to host eggs**

Suckering Blackthorn shooting out from the ground at the edge of bushes and/or fresh young (1-2 year old) Blackthorn twigs (small shoots without leaves) located 0.25-1.75m off the ground.

Type of Blackthorn A-C unsuitable, D-E suitable for Brown Hairstreak eggs . Note F is Plum in suitable condition



Think carefully about the route selection, given that it will be fixed over time and walked over a number of years.

Once the egg count route has been established, produce a route map and fill out a site details form.

**How to complete a survey**

**A typical survey:** The method involves searching those suckering shoots and twigs of Blackthorn in the correct growth form for Brown Hairstreak and counting the number of eggs found for up to 2 hours. If searches are too long you will likely lose concentration, miss eggs

and give unreliable results. A two minute break every 15 minutes of searching is recommended to ensure you remain focussed whilst recording.

If there is more than 100m of Blackthorn habitat and you have completed 2 hours of survey, do not sample any more. The total amount of suitable habitat (including any not searched) will be reflected in your estimate of the % of suitable habitat present. In the final analysis your egg count will be scaled up to an estimate for the whole route.

In summary a two hour egg count survey might involve searching suitable Blackthorn for an hour and three quarters, with fifteen minutes for breaks and travel between areas of suitable and unsuitable habitat.

**Which eggs to count:** Count all Brown Hairstreak eggs including those parasitized (a lateral hole), predated or damaged and beware of similar eggs laid by certain moths (see Box 3)..

### Box 3: Brown Hairstreak eggs



Photo by Gillian Thompson

The eggs are like miniature sea urchin shells – rounded and intricately patterned - and only about 1mm in diameter. It sounds like these tiny white eggs would be impossible to find but their bright white colour really stands out on the dark twigs and their texture almost makes them sparkle in the winter sunshine. The eggs are fairly easy to find once you 'get your eye in'. A hand lens may come in handy for identification. Manage expectations – it's not unusual to have a fairly low strike rate and to see no more than one egg per 10m of suitable habitat (*i.e.* per 10 minutes of searching).

**Confusion species:** Green-brindled Crescent (conical eggs), Blue-bordered Carpet (lozenge-shaped eggs, often in pairs)

**Speed of searching:** Search effort should be at a consistent pace, according to habitat condition. **Search at an average rate of 1 minute per metre of Blackthorn in suitable condition.**

In the survey, you are not expected to find every single egg, rather detect a constant proportion based on a tried and tested intensity of search effort per unit of suitable habitat. In practise areas of densely suitable Blackthorn may take 2 or more minutes to search

effectively, whilst sparsely suitable Blackthorn may take less than half a minute, but these differences should even out over the survey.

**Where to search:** Searching for eggs in those parts of hedges, field margins and corners, woodland rides, areas of scrub which Blackthorn in a suitable condition/growth form to host eggs – *i.e.* suckering Blackthorn and/or fresh young Blackthorn twigs (see Box 2). Brown Hairstreak eggs are most frequently found at the junctions between the new growth and the old wood so you should target your efforts here, especially between knee and head height. Though less important, buds and bark in the vicinity of these forks should be frequently scanned for eggs.

Give equal weight to suckering plants and bushes - if the hedgerow contains both twigs and suckering Blackthorn in the field margin, alternate between searching suckers and twigs in each minute of search effort.

**Summary of search height:** 0.25m-1.75m, spending 75% of time in the 0.5-1.5m zone.

You do not need to spend any time searching blackthorn bushes not in the correct growth form; similarly you should ignore all non *Prunus* bushes. For example, if there is 50% Blackthorn (or Bullace) cover along a 180m long hedge and 40% of this is in unsuitable condition (36m), you will only be searching 33% of the hedge (54m).

**Egg count route width:** Up to 2m out from the edge of the hedge and along woodland edges and 1m either side of the egg count route line in scrubby grasslands and within woodland.

Only search along your pre-determined egg count route and within the width limits described above.

**Time of year:** Brown Hairstreak eggs may be found between October-March, but we recommend you only survey between early November and the end of mid-December, depending on how early or late the autumn has been. The objective is to carry out a survey soon after autumn leaf fall and before late winter when significant mortality of larvae may have occurred or when new leaf/flower growth makes finding eggs really difficult.

**Time of day:** 09:00-16:00 subject to weather conditions.

**Weather conditions:** Avoid snow, strong haw frosts, heavy rain, fog, glare, strong winds.

**Number of recorders for each egg count:** We recommend that each survey route is monitored by one observer. If you choose to do a survey with another person, first undertake training and compare surveys to ensure you both survey in a consistent way and find similar numbers of eggs. On survey days, split the route in half and sample half each to avoid double counting.

**Habitat recording:** Make sure that you walk the full length of your egg count route to estimate the % in suitable habitat condition for Brown Hairstreak eggs. For example if a 200m long hedge had 150m of Blackthorn with 100m in suitable condition for Brown Hairstreak, the amount in suitable condition would be 50%.

If you do not feel confident about subjectively estimating the % of Blackthorn along the route in suitable condition or would like a more objective approach, please follow the guidance and fill out a habitat suitability form whilst completing your survey. The method involves recording presence/absence of Blackthorn in suitable condition every 5m along your survey route, with up to 500 measurements required.

**How often:** Only one count per year is needed for each route established.

## Search effort in year 2

As in year 1, there is no need to spend more than two hours searching for eggs.

**If habitat quality has not changed (i.e. there is the same amount of suitable habitat as in year 1)**

Aim to spend the same amount of time searching for eggs as in year 1.

**If habitat quality has increased (i.e. there is more suitable habitat to sample) and you spent less than two hours sampling in year 1**

Aim to spend more time searching for eggs than in year 1, up to the two hour limit.

**If habitat quality has increased (i.e. there is more suitable habitat to sample) and you spent the maximum two hours sampling in year 1**

Aim to spend the same amount of time searching for eggs as in year 1.

**If habitat quality has decreased (i.e. there is less suitable habitat to sample)**

Aim to spend less time searching for eggs than in year 1.

If flailing has occurred over the entire area, only spend time looking for eggs where cutting has missed fresh Blackthorn growth. If hedges have become neglected (e.g. five or more years since cutting) fresh growth (shoots) will be in short supply and only these areas need to be checked. Remember, the aim of monitoring is to make sure all/sample areas of Blackthorn in a suitable growth form for eggs are checked in a thorough and consistent way each year. The aim is not to check all Blackthorn, regardless of suitability for Brown Hairstreak eggs.

**Health & safety:** Blackthorn is a thorny bush, and when inspecting branches beware of their long spines, as it is easy to prick your finger and draw blood. Furthermore, make sure you hold branches firmly, to avoid them springing back and whipping you in the face. For further details on Health and safety see

[http://www.ukbms.org/Downloads/Wider\\_Countryside/Health%20and%20Safety%20Guidance-%20Butterfly%20Monitoring1.pdf](http://www.ukbms.org/Downloads/Wider_Countryside/Health%20and%20Safety%20Guidance-%20Butterfly%20Monitoring1.pdf)