The Brown Hairstreak: *Thecla betulae* L.

I: Searching for Ova

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The traditional method of collecting the Brown Hairstreak butterfly is to beat the blackthorn bushes in May and June. This recommendation has been perpetuated, if not actually endorsed, by the entomological fraternity over a considerable period, and appears in nearly every textbook dealing with British butterflies. Writing in 1934, in "The Complete Book of British Butterflies", F. W. Frohawk observes . . . "Nearly all specimens in collections have been bred from larvae obtained by beating blackthorn bushes, the larval foodplant for this species". Over 40 years later, in "Aberrations of British Butterflies", my good friend Donald Russwurm comments . . . "The larvae, however, can be beaten from the bushes in a blackthorn thicket and most collectors obtain their short series in this way". These two statements are, I am sure, accurate in regard to the method as well as the proportion of collectors who employ it. The acquisition, or indeed, the detection of *T. betulae can* be effected by this means but perhaps because the advice is so often given, it is assumed to be the best available.

When considering the relative merits of two methods of securing the same object, it rarely happens that one has so little in its favour that the other becomes the automatic choice. It is, however, my firm contention that ova searching, as an alternative means of locating *betulae,* has so many advantages that, if given a fair try, would soon relegate the business of beating to obscurity — at least, as far as *betulae* is concerned.

Only once have I attempted to beat for larvae. I was neither enamoured of the process nor pleased with the result. The first difficulty I encountered was that of laying out the bed sheet I had chosen as a collecting surface. The frequency with which blackthorn thickets are surrounded by tussocks of strong grasses, brambles and, predictably, blackthorn seedlings, is pronounced, and I found this seemingly simple task quite tedious. More often than not, the sheet duplicated the contours of some miniature mountain range — hardly a surface conducive to retaining those numerous species of larvae which instinctively roll themselves into mobile little balls when rudely disturbed. Ironically, this habit, adopted in the course of evolution as a protective device serves only to enhance the probability of their premature demise, for it seems likely that a proportion of the larvae finding themselves in the grass some distance from their preferred habitat, do not regain the security of the blackthorn twigs. When asked what happens to the larvae which fall to the ground, the proponents of the beating technique almost invariably reply, "Oh, they crawl back up". Well, I must admit, I hardly expect to be told that a number don't make it, having fallen prey to whatever. As far

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as I know, the reality of this aspect of beating is one of ignorance and in the absence of concrete evidence substantiating what appears to be little more than wishful thinking, I am inclined to the view that one should afford the inhabitants of blackthorn thickets, amongst which may be counted numerous creatures other than lepidoptera, rather more consideration.

Apart from this, minor irritations arising from inadvertently disarranging the sheet in an effort to get at the blackthorn of interest, manoeuvering the same into a suitable position without becoming impaled on the thorns and finding enough room to wield the beating stick, added to my growing reservations. When I discovered how much detritus was dislodged along with scores of insects — everything it seemed except *betulae* — my disillusionment was complete. However, one is advised to count one's blessings and in deference to this pearl of wisdom I am obliged torecord that my singular experience of wrestling with blackthorns, bed sheets and beating sticks, was unattended by strong winds or rain. The thought of inclement weather obtruding upon my adventure, conjures up a vivid picture of a sodden white sheet marooned high in some oak like a stricken kite!

The problem of working in confined spaces may be overcome to some extent, by substituting the ground sheet for a hand held tray. However, the limitation in the size of the collecting surface is a detraction and it would also seem that the efficient use of the device requires three hands — one for the tray, one for the blackthorn and one for the beating stick.

The one situation for which, I believe, any variation on the beating theme is totally impracticable, relates to the machine-trimmed hedgerows, now a familiar sight in the British countryside. In Devonshire and Wales particularly, the hedgerows comprise the most important, and in some areas, the sole retreat of *betulae*. The short, dense convoluted growth is the most characteristic feature of these hedges. The blackthorn is often entwined with other shrubs such as dogrose, bramble and hawthorn which demand respect in their handling, but it is the strength and resilience of close-cropped hedges, conferred by repeated clipping, which render them quite unsuited to beating. The frequent association of ditches with roadside hedgerows is an additional deterrent. Of 141 new *betulae* sites I've located in the past three years by ova searching, all but three have occurred in hedgerow habitat which is either incoveniently sited or subject to periodic clipping, so that the self-imposed restriction suffered by the beater in his choice of collecting ground is considerable.

Despite the aforementioned difficulties, some of which may relate simply to my own inexperience, beating for larvae has, over the years, proved an efficacious means of obtaining *betulae*. That is a fact I would not question. However, efficiency, in terms of time as well as energy expenditure, is altogether a different consideration and it is on this basis that ova searching, in my opinion,offers its greatest advantage. To my own satisfaction at least, I have demonstrated that the examination

of a blackthorn stand, divested of its foliage in winter, takes somewhat less than a fifth of the time required for beating. Moreover, in considering the *rate* at which ova or larvae are found — the real measure of efficiency — it is clear that ova searching has a greater potential than would be indicated by a mere comparison of searching time. This is, of course, due to the higher incidence of ova than, say, half-grown larvae in a given locality and arises from natural depletion which accumulates in progressing through the metamorphic stages. Whilst it is true that not all ova will be seen, it is, presumably, equally true that not all beaten larvae will be detected and, indeed, some may even reside in scrub inaccessable to the beater but not to the ova seeker. I do not know what the average ratio of ova to half-grown larvae is, but I would be surprised if it was less than 5 : 1. Whatever it might be, the ratio of ova to larvae will be relevant to the maintenance of *betulae* colonies which receive attention from collectors, for proportionately less damage will be incurred by the removal of ova. Assuming, for the sake of argument, the quoted ratio is correct, it is evident that the consquence of removing five ova is equivalent to the removal of one half-grown larva. Moreover, if on average, 20 ova give rise to one pupa, the damage inflicted by the inadvertent elimination of a pupa whilst beating for caterpillars would be four times greater than that of removing a single half-grown larva.

It would seem therefore the beater needs to exercise care in choosing his time for beating. If he goes too early he may overlook the smaller larvae and if he goes too late, some may have pupated and of those that have, some may be damaged. I have no experience of *betulae* larvae in the wild, but in the absence of uniformity in the rate of larval development, the risk to the species, as well as the practical implication of detecting beaten larvae, is ever present.

In contrast, ova may be sought in a much more leisurely fashion at any time from the beginning of winter to the onset of spring and with relatively much less regard to weather conditions. I well remember finding my first ovum during a light fall of snow.

For anyone who has never seen a wild *betulae* ovum, it may be difficult to appreciate how easy it is to spot the large, brilliant white egg against its sombre background. It is entirely due to this marked contrast which enables the blackthorn to be inspected so quickly. It is not necessary to examine every twig individually, one simply scans rapidly but systematically and if ova are present they will catch the eye. My wife once discovered a new Welsh site for *betulae* by spotting an ovum in a roadside hedge through the window of our slowly moving car. Subsequently, we found another 56 ova deposited on the residue of hedge clippings, strewn about the verges and the road. More recently I discovered a new locality for *betulae* in Devonshire by locating several ova at night with the aid of a torch. The fact that, in the light of the following day, I found

ova on just about every twig of every bush in the area perhaps lends credibility to a remarkable example of serendipity!

Proficiency at any task improves with practice — I suppose even I could learn to beat for larvae were I so motivated — and one soon recognises that particular types of twigs on particular types of bushes are shown more favour than others as sites for ovipositing. I believe that the greatest dissuasion confronting the novice in the interesting and even exciting diversion of ova searching is, paradoxically, the easiest to overcome and that is the important psychological step of finding one's first ovum. As a very good friend — a former, confirmed beater — once remarked, "It's only a matter of getting your eye in".

It is worth mentioning that by rearing *betulae* from ova, a bonus awaits the collector whose predilection is for large insects. I have measured the fore-wing length of the 28 male and 25 female *betulae* of the R. W. Watson collection, and the mean values are 20.0 (standard deviation, 1.08) and 21.2 mm. (S.D., 0.73) respectively. All 43 insects originated from beaten larvae. The corresponding means of 57 males and 52 females — all from wild ova — in my own collection are 21.8 mm. (S.D., 0.55) and 22.2 mm. (S.D., 0.57) respectively. The differences are statistically highly significant. It will be appreciated that the comparison of a linear dimension does not adequately convey the subjective impression of the overall size difference.

A similar size disparity, associated with the same two methods of collecting, is also apparent in *Quercusia quercus* L. and *Strymonidae w-album* Knoch. Regarding the cause of the difference, I favour the hypothesis presented to me by Dr. Christopher Luckens, that beaten larvae undergo a trauma, as a result of their violent eviction, which induces premature pupation. Although the association is admittedly rather tenuous, it is interesting to consider this hypothesis in relation to the rather large difference in the standard deviations of the mean sizes of insects originating from beaten larvae and wild ova. If, as I suspect, the variation about the mean rate of development of wild larvae differs significantly from that of larvae captively reared from ova, it follows that a random sample of wild larvae will have a greater size variation than a corresponding sample of captive caterpillars. Now, if the full extent of the subsequent development of the wild larvae is related to their size at the time of their removal from the wild, it is clear that this will reflect on the variations in the size of the adult insects. The definitive test of the hypothesis is, of course, a comparison of adults reared from wild ova and those from larvae which have been carefully removed, rather than beaten, from their natural environment.

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