**Ashworth’s Rustic, *Xestia ashworthii*, (Doubleday, 1855) - some notes.**

Ashworth’s Rustic was discovered, new to science, near Llangollen, Denbighshire in 1853 by a local lepidopterist, Joseph Ashworth. The first specimen was noted as being taken “about a mile from the nearest limestone”, a comment that suggests that Mr Ashworth himself considered the moth may have originated from the imposing escarpment of Carboniferous Limestone known as Creigiau Eglwyseg that dominates the landscape to the north of Llangollen. The idea that the moth is associated with limestone has persisted ever since and it is one of the aims of this paper to demonstrate that this presumption is inaccurate.

**History**

Mr Ashworth’s specimens were passed over to Mr Henry Doubleday who, having consulted with a Continental colleague, went on to describe the species in 1855 under the name *Agrotis ashworthii*. Confusion arose from the fact the moth was also described and illustrated in the Entomologist’s Annual (Stainton, H.T.) in 1855 under the name *Sphaelotis vallesiaca,* based on specimens taken by a group of collectors in 1854; however, this name was soon abandoned. Some years later, in 1871, the situation was further confused by the description of a similar moth from Central Europe under the name *Agrotis candelarum* Staudinger, 1871. (Type locality: Germany, Switzerland, France and Urals). For some years the status of the British moths was the subject of debate, with some authors considering the British moths to be a variety (*var. ashworthii*) of this European species whilst others favoured the idea of a separate and distinct British species. Nowadays, Doubleday’s original description is recognised as having priority and the British moths are considered to form the nominate subspecies whereas the European and Asian insects are assigned to other subspecies - subsp. *candelarum* in Central Europe, subsp. *jotunensis* (Schoyen, 1887) in Scandinavia and subsp. *lactescens* (Turati, 1919) in Italy. Ashworth’s Rustic has been assigned to several different genera since its first description including *Agrotis* originally, *Amathes* and currently *Xestia* (subgenus *Megasema*).

At the time of the original discovery, moth collecting was a fashionable and popular pastime, as evidenced by the immediate rush of collectors to the scene of the discovery. There are varying, and slightly conflicting, accounts of the early collecting activity at Llangollen (e.g. Tait, 1923) but it is apparent that numerous lepidopterists visited with the specific aim of adding this moth to their collections. (Remarkably, Joseph Ashworth also discovered another moth, in 1854, new for Britain, very close by, viz. the Welsh Clearwing, *Synanthedon scoliaeformis* Borkhausen, 1879. The presence of two new moths must have made the journey to Llangollen seem especially worthwhile). Unfortunately, the exact site of all this collecting activity is not clear and was probably kept deliberately secret at the time. The grid reference attached to these early records in modern databases (SJ215460) may be a fairly recent guess, i.e. it should be interpreted as an estimated site centroid rather than the actual location. This particular 100m grid square, near a property called Plas yn Eglwyseg, lies on acidic Silurian shales to the west of the limestone escarpment, a fact which does tie in with the description of being “about a mile from the limestone”.

Further localities were soon discovered in northeast Wales, e.g. near Llanferres (Gregson, 1856) and, some decades later, in 1881, the known range was extended into northwest Wales near Penmaenmawr (Moel Llys, now spelt Foel Lûs). Since then this locality, and especially the Sychnant Pass nearer Conwy, has been the focus of attention for most visitors seeking the Ashworth’s Rustic.

**‘Slate and Limestone’**

Commencing at the time of the initial discovery, the assumption that this species is associated with limestone became accepted and went unquestioned by succeeding generations of lepidopterists. For example, Vol. III of The Lepidoptera of the British Isles (Charles G. Barrett, 1896) states that the moth “sits in the daytime on limestone rocks”. In 1923, R. Tait writes about the common occurrence of the moth on the rocks at Penmaenmawr and “almost to the foot of Snowdon”. He comments: “From this limestone strip the insect rarely seems to stray” although he does then go on to mention a few other (equally acidic) sites. One suspects that he assumed, incorrectly, that the rocks he was describing were limestone simply because of the presence of the moth. There are several other similar examples in the early literature where authors appear to be basing their lithological interpretations on the presence of this moth rather than by direct observation or by consulting a geological map.

At some stage in the 20th Century it became apparent that the moth is not restricted to limestone and since then the phrase favoured by authors has been ‘slate and limestone’. The quarries near Penmaenmawr are actually for ‘granite’ (or more accurately rhyolite) rather than slate although slate has been quarried nearby. However, slate is commonly associated with North Wales[[1]](#footnote-1) and it must have been assumed that this was the bedrock wherever the moth was found other than what was taken to be limestone. The expression ‘slate and limestone’ has been repeated numerous times ever since and is to be found even in some of the most recently written books, species accounts and Biodiversity Action Plans.

An association with limestone would be plausible if the larval foodplant was restricted to limestone. However, an association with both slate and limestone seems highly implausible. In fact, we now know that the moth is found commonly throughout the hilly areas of North Wales, with no preference for any particular rock type. The moth is numerous on many different acidic rocks, including intrusive and extrusive igneous rocks as well as sedimentary rocks (mudstones, siltstones etc.) where these are exposed. Indeed the only rock type from which the moth has not been recorded recently is limestone which is curious and may, possibly, be due to lack of recording effort. However, it should be added that some limestone sites, such as the Great Orme, lying very close to Conwy Mountain and the Sychnant Pass, have been well studied.

Thus the true requirement seems to be for exposed bedrock of any sort but especially acidic rocks. Scree slopes, broken ground, cliffs and quarries are all favoured, from modest altitudes[[2]](#footnote-2) to high in the mountains. Slate, being a soft rock is usually not exposed other than in quarries and so is particularly inappropriate to single out in this connection.

**Association with Exposed Rock**

The evidence for an association with areas of exposed bedrock is based on a century and a half of observations. Although the adult moths wander widely and turn up more or less anywhere, the larvae have only ever been found in rocky areas. A sceptic might question this and point out that since collectors concentrate their attention on rocky areas they may be overlooking the presence of larvae elsewhere. Whilst strictly true, there comes a point where the weight of evidence becomes overwhelming; the larvae are conspicuous and this author, for one, would surely have noticed larvae elsewhere if they were generally distributed.

Why the moth favours exposed rock is a matter of speculation. It is true that the adult moth is superbly camouflaged when resting on the light grey lower Palaeozoic rocks of North Wales. However, the author’s own observations are that when adult moths are released onto a rock surface they immediately scuttle off and hide in nearby vegetation. Further, this author has never, in forty years walking the Welsh hills, disturbed an adult Ashworth’s Rustic from a rock face.

The larvae are also reasonably well camouflaged when resting on rocks but, given the need to feed, they tend to spend much of their time on nearby plants where they are remarkably conspicuous.

A further suggestion is that the requirement for bare rock applies specifically to the larval stage possibly for reasons to do with thermoregulation (Julian Thompson, pers. com.). Indeed, larvae have been seen basking on bare rock surfaces but exactly why this should be advantageous is not immediately obvious. Also, the fact that other closely related species, e.g. Neglected Rustic *Xestia castanea* (Esper, 1798) and Heath Rustic *Xestia agathina* (Duponchel, 1827) occur alongside Ashworth’s Rustic but without any need for bare rock tends to argue against the idea.

The association with rocky places appears to be a feature of the species throughout its extensive Palaearctic range[[3]](#footnote-3), where the moth has been described as “pseudo-boreoalpine”, occurring down to sea level in Norway but restricted to higher altitudinal zones further south (Fibiger, 1993). It is clear that the species became adapted to living in rocky places long before it arrived in the British Isles, so it may be that there is no need to seek a current, local explanation for this behaviour. The true explanation may be that this behavioural adaptation did provide a selective advantage long ago in some possibly remote geographical locality, conceivably under very different conditions to those pertaining in North Wales today. In other words this behaviour may be vestigial, and is selectively neutral at the present time.

**Larval Foodplants**

A bewildering array of plants has been suggested as larval foodplants for Ashworth’s Rustic. Whilst it is undoubtedly true that the larvae are polyphagous most of these plants seem fanciful, based as much on guesswork as observation.

The early assumption of an association with limestone led to the notion that calcicolous plants such as Common Rock-rose *Helianthemum nummularium*, Lady’s Bedstraw *Galium verum* and Salad Burnet *Poterium sanguisorba* are utilised. Indeed Common Rock-rose *Helianthemum nummularium* usually leads the list of foodplants, even in modern works. Whilst the possibility that some or all of these plants might be utilised cannot be refuted, it has already been pointed out that the moth is not known to breed on limestone sites such as the Great Orme, where these plants thrive. In contrast the nearby sites where the moth occurs abundantly do not support these calcicoles.

Another plant, often mentioned in recent literature, is Foxglove *Digitalis purpurea* which, although it can occur almost anywhere on recently disturbed or burnt ground, is not typically associated with Ashworth’s Rustic habitat.

Plants which do occur alongside the larvae in the wild include such hardy, relatively sheep-resistant acidophiles as Heather *Calluna vulgaris*, Bell Heather *Erica cinerea*, Bilberry *Vaccinium myrtillus*, Heath Bedstraw *Galium saxatile*, English Stonecrop *Sedum anglicum* , Sheep’s Sorrel *Rumex acetosella* and a few grasses; it is these species that need to be considered more carefully.

**Rearing Experiments**

Ashworth’s Rustic larvae are comparatively easy to obtain in the wild, as their habit is to emerge from their hiding places in the daytime to bask and feed in spring sunshine. Over the last ten years, or so, a number of larvae (one or two in most years) have been collected by the author, both locally in Merionethshire and in other acidic areas of Snowdonia, and reared through to adulthood. Particular attention has been given to making available various plants which either occur where the larvae were found or are mentioned in the literature. Obtaining samples of the calcicolous plants involved driving considerable distances and it hardly seems surprising that none of these plants were touched - the larvae stopped eating completely and, it was presumed, would have starved to death had no alternative been offered. In contrast the larvae were found to eat Heather *Calluna vulgaris* and Bell Heather *Erica cinerea* although slowly and with infrequently produced, small, dry frass. What soon became apparent was that one plant that is ubiquitous and available at almost[[4]](#footnote-4) all known sites is devoured with great enthusiasm, accompanied by copious, large, moist frass production. This plant is Heath Bedstraw *Galium saxatile* which grows in turf, amongst scree and on rock faces and ledges even where sheep grazing has eliminated most of the floral diversity.

Other plants made available to the author’s captive larvae have proved unacceptable. These include Sheep’s Sorrel *Rumex acetosella* which does often occur alongside the wild larvae; English Stonecrop *Sedum anglicum* which is also often frequent where the larvae are found; Harebell *Camapanula rotundifolia* which occurs occasionally and other plants such as Goldenrod *Solidago virgaurea* which survives on many cliffs in Snowdonia, out of reach of sheep.

Foxglove *Digitalis purpurea*, already mentioned, has been totally ignored on all occasions.

Wild Thyme *Thymus polytrichus* is another plant usually mentioned in the literature as one of the principal foodplants. This plant requires only mildly basic conditions and does occur in the mountains of Snowdonia on rocks such as dolerite. However, it is absent from most Ashworth’s Rustic sites and has been refused by the author’s captive larvae.

Many previous accounts of rearing Ashworth’s Rustic larvae are convincingly detailed and authoritative (e.g. Bowes, A.J.L., 1942 and Goater, B., 1972). Both these authors, and others, report successfully rearing Ashworth’s Rustic larvae on conveniently available plants such as willows *Salix* spp and dandelions *Taraxacum agg*. However, both these plants have been ignored by all the larvae reared by the present author even when given as the sole offering. This discrepancy in findings is difficult to explain and yet cannot be ignored – the author can only relate his own observations and findings. Larvae reared *ab ova* might be expected to be more flexible in their choice of foodplant as compared to late instar larvae, collected from the wild, which are already habituated to naturally occurring plants. However, both the authors cited obtained their larvae in late April so this explanation is inadequate. No comment can be made except to say that this author has had a near 100% success rate in rearing larvae through on Heath Bedstraw *Galium saxatile*, Heather *Calluna vulgaris* and Bell Heather *Erica cinerea* with all other plants rejected. Neither dandelions *Taraxicum agg.* nor willows *Salix* spp typically occur in Ashworth’s Rustic habitat, so there is no question of these being important foodplants in the wild.

**Observations of Feeding in the Wild**

The finding of an Ashworth’s Rustic larva is an exciting event for most naturalists and it is understandable that the immediate inclination is to rush in and pot up the larva for close examination, photography etc. The problem is that larvae found on a particular plant may just be basking rather than feeding, so no assumptions should be made without careful observation. For example, larvae have been found on grass heads (John Bratton, pers. com.) and on Western Gorse *Ulex gallii* (e.g. Bowes, A.J.L., 1942) but it does not necessarily follow that these are foodplants -larvae are also found basking on bare rock.

The author admits to being guilty of excessive haste on occasion but has observed larvae in the wild feeding on Heather *Calluna vulgaris* and on the tender young buds of Bilberry *Vaccinium myrtillus*. On other occasions larvae have been found apparently just lying on the turf and it was assumed at the time that these larvae may have fallen off the cliffs above. However, now that the feeding preference for Heath Bedstraw *Galium saxatile* has become evident, it seems probable that these larvae were actually on their foodplant which commonly grows within the turf as well as on and amongst rocks.

In early May 2010 the author collected a larva from a scree slope on the southern flanks of Arenig Fawr, Merionethshire where the flora was particularly limited, in part due to sheep grazing. The only vascular plants noted were Heath Bedstraw *Galium saxatile*, English Stonecrop *Sedum anglicum*, Common Bent *Agrostis capillaris* and Sheep’s Fescue *Festuca ovina* with a little Parsley Fern *Cryptogramma crispa* amongst the scree. The nearest *Calluna* was approximately 30m metres away. This observation, taken together with the established feeding preferences, suggests that the presence of Heath Bedstraw *Galium saxatile* in rocky places is sufficient to constitute breeding habitat.

**Distribution**

One of the most intriguing questions associated with this insect is why it should be restricted in Britain to the northern half of Wales. The answer may be connected to the fact that many hundreds of kilometres of unsuitable habitat separate this region from the nearest colonies elsewhere in Europe so that the colonisation of Britain as the last ice sheet retreated was by no means inevitable. Somehow, as a result of a highly improbable event, or sequence of events, the moth did reach the suitably rocky hills of North Wales but did not reach the equally suitable habitat in the Lake District or the Scottish Highlands. One possibility is that these areas may yet be colonised either by natural or anthropic means; the moth will surely thrive if it ever does get there.

The moth is currently known from well over thirty ten-kilometre squares, ranging from Plynlimon in mid-Wales to the north coast near Penmaenmawr. Many ten-kilometre squares remain blank due to under-recording whilst other ten-kilometre squares are actually unsuitable due the smooth, unbroken nature of the terrain, e.g. most of the Berwyn Mountains. There is some evidence that quarries have extended the range into some of these areas of gentler terrain. For example, there are recent records from a quarry near Lake Vyrnwy to the south of the Berwyns.

**Conservation Status**

The moth is included in the UK BAP on the basis of the restricted range and the paucity of recent records. It is also included in the Snowdonia National Park LBAP.

One reason for the relatively small number of locations from which the moth has been reported is that visiting lepidopterists, anxious to see this famous Welsh moth, naturally wish to maximise their chances of success and so choose to visit the most famous site which is undoubtedly the Sychnant Pass. Indeed the Pensychnant Conservation Centre holds an annual Ashworth’s Rustic night which is very popular and which is almost invariably successful in catching both the Ashworth’s Rustic as well as that other North Wales speciality*,* Weaver’s Wave *Idaea contiguaria* (Muller, 1936).

In contrast, the small number of resident lepidopterists tend already to be familiar with the species, as wandering adults turn up even in garden moth traps some kilometres from suitable habitat. This familiarity leads to a disinclination to seek out new sites.

In fact, the moth is common, or even abundant, in rocky places throughout Snowdonia, as evidenced by recent personal experience and as has been noted by previous authors (e.g. Morgan, M.J., 1974; Young, M.R., 1974). The latter author, writing about a site in the Rhinog hills, refers to the moth as one of the ‘dominant’ species. The current author concurs with this view.

It will always be desirable to obtain more records from more sites and all visitors and residents are encouraged to try to do so. The adult responds very well to light, arriving soon after dark. It is perfectly feasible to carry a collapsible actinic trap/Lithium ion battery combination anywhere in Snowdonia, no matter how remote and positive results can almost be guaranteed – in suitable habitat and weather. Alternatively, searching for the larvae on warm, sunny days in late April/early May is often successful; the author quickly found two larvae by one of the parking areas on the A5 by Llyn Ogwen on the 3rd May 2012. With two larvae found so close to the car park and many hundreds of hectares of similar terrain visible (and tens of thousands of hectares of similar terrain in North Wales) it is clear that this moth has a substantial overall population and is not in any way threatened at present.

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**Conclusions**

* Ashworth’s Rustic is a common species in areas with exposed bedrock throughout northwest Wales. The range extends, patchily, into the generally less suitable, gentler terrain of mid-Wales. There appear to have been no records from northeast Wales for almost forty years, probably due to lack of recording effort.
* There is no special association with any particular rock type with most known sites being on acidic lower Palaeozoic rocks. Whether there are any extant colonies on limestone appears to be an open question.
* The larvae are polyphagous but show a marked preference for Heath Bedstraw *Galium saxatile* – a plant which is present at most known sites and the presence of which appears to be sufficient to support the species. Heather *Calluna vulgaris*, Bell Heather *Erica cinerea* and Bilberry *Vaccinium myrtillus* are also utilised. Most of the other plants cited in the literature either do not occur alongside the larvae in the wild or have proved unpalatable to captive larvae. These plants (and others) may, or may not, be used on occasion but are certainly of lesser importance to the species.
* The moth is not currently threatened as Heath Bedstraw *Galium saxatile* can survive even the typically heavy levels of sheep grazing prevalent in most of North Wales. Heather *Calluna vulgaris* and Bell Heather *Erica cinerea* have been eliminated from many sites by sheep grazing but remain common plants overall. Further, the rocky upland habitats are inherently unsuitable for land improvement.

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1. Early 19th Century geological maps distinguished only two rock types in North Wales: ‘slate’ and ‘killas’. (The latter being a Cornish mining term for metamorphosed sedimentary rocks). (Smith, B. & Neville George, T., 1961) [↑](#footnote-ref-1)
2. The lowest altitude at which a larva has been found in recent decades appears to be slightly below 200m a.s.l. (Debbie Evans, Conwy Mountain, SH747783, 26/04/1997). However, it seems likely that larvae could be found much lower, possibly down to sea-level in a few places, such as Conwy Mountain, where the scree extends down to the beach. [↑](#footnote-ref-2)
3. The world range extends south to Turkey and the Caucasus and east to Tibet and Irkutsk, Siberia. (Fibiger, 1993) [↑](#footnote-ref-3)
4. *Galium saxatile* was not noted on a recent visit to a known site in the Sychnant Pass and may be absent there. The rock involved is a very acidic rhyolite, supporting only a few vascular plants (including *Calluna vulgaris* and *Erica cinerea*). [↑](#footnote-ref-4)