

Identifying macro-moths with micro-features

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Abstract

This article explores the use of external microscopic features to support the identification (ID) of macro-lepidoptera. The usual process of identifying macro-moths focusses on the wings, which are often large and distinctively patterned. Matching an unknown specimen to reference pictures is often the identification method employed, but as shown in the example here, can give a misleading result. However, microscopic features may be used to narrow the field of candidate taxa to arrive at a robust identification.

A Difficult Specimen to ID

The specimen in question was taken at sugar 2020-08-16 on the Rutland Water Nature Reserve. It would have been recorded as a very worn example of *Hypena proboscidalis* (The Snout) if it had not briefly raised its wings in a posture uncharacteristic for this species, placing an element of doubt in this presumption. As can be seen in Figure 1, the specimen lacks the long, forward pointing palps that give the Snout its vernacular name, but its wings have the same slightly hooked shape and similar median fascia as the verified *Hypena proboscidalis* illustrated in Figure 2. It would be easy to presume that the palps have been broken in what appears to be a worn specimen, but examination under magnification, as shown in Figure 3 reveals that the palps are short and undamaged. Less obvious, because it is less often mentioned in the descriptive text of guide books, is the lack of ocelli above the compound eye, which eliminates *Hypena proboscidalis* as a candidate taxon for the specimen.

The Identification Method

Identification of an unknown Lepidoptera specimen may be thought of as the process by which the observable features are matched to those of a known taxon. For a general discussion on the topic of identification Pankhurst [1978] is still relevant to the field naturalist today. Given that there are about 2,500 UK Lepidoptera taxa of which around 450 are thought of as ‘the larger moths’ a

systematic approach is needed as an alternative to randomly flipping through the pages of a guide looking for a match.

Inspired by Pankhurst, the approach followed by the author is to list plausible candidate species and to mark each with a '+' for matching features and '-' contradicting features. A '?' is used to indicate that a feature is either 'not known' or not yet determined. An identification is achieved when one of the candidates has multiple '+' and no '-' against its name. A well written dichotomous key will lead you through a functionally identical process, as will a computer driven 'multi-access' key. Unfortunately, there are not many keys covering macro-moths such as those under consideration here. The take-away message is that a robust identification should always rely on the matching and rejection of multiple characters, some of which may be too small to be observed by the unaided eye.

Putting this into practice, examination of specimens under 3 — 30 x magnification reveals additional characters in both live and preserved specimens. The low magnification required places these features in range of hand lenses and USB microscopes.

Making a Determination

We start by noting observations about the unknown specimen: Forewing length: 16.7 mm; Forewing width: 11.4, mm; Ocelli: Absent; Labial palps: Forward. Flight time: August. The gender can be determined by examination of the frenulum, which links the wings together in moths. In males, it consists of a single bristle in males, and a pair in females. Both specimens here are females.

Unfortunately there are a few resources listing the features we need to consider, but a good place to start is the matrix key published by Dombroskie [2011]. While it is intended for Canadian Lepidoptera, it can also be used to provide an indicative guide to UK lepidoptera families. Importantly, it is a useful indication of characters that can be used to find the likely family of a specimen.

Using the Canadian Lepidoptera Key, (See Figure 3), the lack of ocelli (simple eyes), coiled unscaled proboscis, and forward facing palps are suggestive of family *Geometridae*. The forewing length of 16.7 mm and the flight time of August are also useful for eliminating many possible UK taxa.

A list of candidate *Geometridae* based on size and general appearance can be made using Skinner [2009] or Waring et al. [2018]. A single species, *Scotopteryx chenopodiata* (Shaded Broad-Bar), matches the size and wingshape, but the unidentified specimen appearance is very plain, and lacks the median dark cross band usually considered typical. The text in Skinner notes the superficial resemblance of this species to *Hypena proboscidalis*. The online resource at http://www.lepiforum.de/lepiwiki.pl?Scotopteryx_Chenopodiata has a photograph of a specimen also lacking the median dark cross band, confirming that such forms have previously been observed.

At this point we can be certain that we have arrived at a robust identification, so further investigation is not strictly necessary. However, the dissection in



Figure 1: The unknown specimen resembling *Hypena proboscidalis*.



Figure 2: A verified specimen of female *Hypena proboscidalis*.



Figure 3: Short undamaged palps eliminate *Hypena proboscidalis* as a candidate taxon.



Figure 4: Long, forward facing palps, and ocelli above the compound eye of *Hypena proboscidalis*.

Figure 5 confirms *Scotopteryx chenopodiata* when compared to the example at http://www.lepiforum.de/lepiwiki.pl?Scotopteryx_Chenopodiata.

Conclusions

This example involving the correct separation of two common species of moth with superficial resemblance can easily be achieved with observations made at low magnifications. In this case the unusually plain form of the unknown specimen was instrumental in misdirection of the ID, a problem exacerbated by reliance on wing markings as the primary focus for identification. We are led to the surprising conclusion that microscopic features in macro-lepidoptera are an overlooked character when achieving a correct determination.

References

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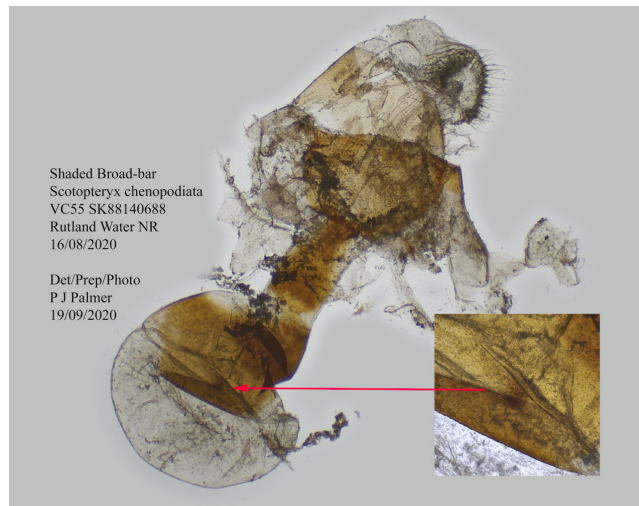


Figure 5: Dissection

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