

## The Cinnabar Moth (*Tyria jacobaeae* L., 1758) (Lepidoptera, Erebidae) and historic agroecosystems

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### Introduction

The Cinnabar Moth *Tyria jacobaeae* L., 1758 is a widespread Eurasian species generally distributed in Britain and Northern Ireland. Harper & Simpson (2002) regarded it as a 'common resident' of Herefordshire and Worcestershire; Fox *et al.* (2013) estimated that it had declined by 67% in Britain between 1968 and 2007. This contribution discusses the regional occurrence of Cinnabar Moth on historic agroecosystems.

### Discussion

In attempting to establish a rationale for *T. jacobaeae* on historic agroecosystems three matters need to be considered: the larval host plants, population ecology and the significance of historic agroecosystems. Cinnabar Moth larvae are universally linked to Common Ragwort (Tansy Ragwort in the U.S.A.) *Senecio jacobaea* L. Exceptions occur in the European Alps and Carpathian arc where other genera of Asteraceae are selected (Koch, 1991; Wink & Legal,

2001) and Plant (1993) cites the past use of Coltsfoot *Tussilago farfara* L. There are many references to *T. jacobaeae* larvae feeding on Groundsel *Senecio vulgaris* L. (e.g. de Worms, 1979) but as far as I can see none relate this to historic agroecosystems. During June 2014 Groundsel was recorded as a host plant of *T. jacobaeae* 90 kilometres east of Moscow where it evidently formed part of a ruderal plant community ([http://www.lepiforum.de/2\\_forum\\_2013.pl?page=1:md=read:id=17387](http://www.lepiforum.de/2_forum_2013.pl?page=1:md=read:id=17387)). In Britain *T. jacobaeae* also behaves in this way on both Common Ragwort and Oxford Ragwort *Senecio squalidus* L. and also on urban brownfield sites (Baker, 1994) as it does elsewhere in Europe (Patočka & Kulfan, 2009).

At a number of locations in Worcestershire, some in Gloucestershire and no doubt more widely, remnants of medieval open fields exist on the fringes of settlements (01). These may be of critical biocultural importance because:

- (i) they represent in varying extent a type of extensive land use which has now mostly been superseded by modern agriculture
- (ii) they may demonstrate not only a visible mosaic of land use change over centuries but also evidence for historical and biological continuity and
- (iii) they maintain and extend diversity.



01. Benshams, Bredon, Worcestershire, showing working lands or strips, some abandoned, assembled within a medieval furlong incised by built development. © 2016 Google Get Mapping plc.

Good examples of this type of land use, even if somewhat degraded, occur at Bredon (Benshams SO9336 29 m altitude (01) and at Little Comberton (Moor Leys Furlong SO9643 30 m altitude) and at various locations along the Isbourne Valley at Winchcombe. These lands were all once glebe land and formed part of their respective monastic estates and they are able to support a distinctive entomofauna (Whitehead, pers. obs.). The land use mosaic created by extensive medieval arable systems provides abundant opportunities for rapidly maturing herbs, such as Groundsel, to proliferate although reasonably rigorous management nowadays limits their extent.

In a classic work, Dempster (1971) demonstrated that large populations of *T. jacobaeae* on Common Ragwort wax and wane cyclically; egg densities of up to 114/m<sup>2</sup> were recorded. This is very different to the situation at both Benshams and Moor Leys Furlong where during the past decade *T. jacobaeae* has occurred in only very small numbers, often in single figures, with no evidence of cyclical

decline. At Moor Leys Furlong Groundsel was first confirmed as a host plant on 8 August 2008 (P.F. Whitehead, pers. obs.) and this was reconfirmed by Mr D.M. Green during 2016 and again during 2017 when he observed that on 1 August a Groundsel plant had been completely defoliated by a single larva. Mr E. Wheel confirmed Groundsel as the host plant at Benshams on 6 June 2014 (01).

A key question in this discussion is whether the ragwort-using populations and the Groundsel-using populations of *T. jacobaeae* are ecologically differentiated or not. At some coastal sites where Common Ragwort and Groundsel cohabit, such as at Walney Island in Lancashire (Emley, 1990), both are used as larval host plants. The evidence from Benshams and Moor Leys Furlong suggests that *T. jacobaeae* demonstrates site fidelity and occurs at low population densities. On the other hand there is some evidence (Whitehead, pers. obs.) of local adult dispersal in Worcestershire and Gloucestershire between 9 June and 16 July; these include records in Evesham town overflying what was once medieval lands forming part of its Abbey estate. A larva of *T. jacobaeae* feeding on

Common Ragwort in a Little Comberton garden on 30 July 2017 (G.H. Green, pers. obs.) may imply that the settlement population there is somewhat more oligophagous and certainly more oligotopic than the grassland ones and that oligotopism is a latent feature of the species made largely redundant by the proliferation of Common Ragwort.

On 29 July 2017 a greatly underfed larva of *T. jacobaeae* was found wandering at Moor Leys Furlong; placed on a leaf rosette of Common Ragwort, where it is a scarce plant of managed grassland not permitted to flower, it fed for some days but was then not seen again. On 30 July 2006 a larva was observed feeding unenthusiastically at the same site on foliage of Common Knapweed *Centaurea nigra* L., apparently a previously unrecorded host plant.

### Conclusion

Traditional agroecosystems in Worcestershire are of high biocultural conservation interest. They support populations of *Tyria jacobaeae* at low densities as outliers from their main grassland foci. These arable land populations may be vulnerable to scarcity of host-plants. Some of these systems were cultivated at least as far back as Roman time (Whitehead, 2016) and it may be that *T. jacobaeae* had an extended presence there prior to its present day near-monophagy on Common Ragwort. These rural settlement populations do not appear to be influenced by cyclical trends and in that sense are distinct; oligotopism may act as a whole population-stabilising mechanism, for example by reducing parasitism.

### Acknowledgements

I am grateful to Mr A. M. G. Darby O.B.E., Mr D.M. Green, Mr G.H. Green M.B.E and Mr E. Wheel for assistance with this contribution.

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### Image

**01.** Benshams, Bredon, Worcestershire, showing working lands or strips, some abandoned, assembled within a medieval furlong incised by built development. © 2016 Google Get Mapping plc