

Reintroduction of the netted carpet moth *Eustroma reticulatum* to Derwentwater, The Lake District, Cumbria, England

John Hooson^{1*} & Kay Haw

¹*Netted Carpet Moth Steering Group c/o The National Trust, The Hollens, Grasmere, Ambleside, Cumbria LA22 9QZ, UK*

*corresponding author e-mail: john.hooson@nationaltrust.org.uk

SUMMARY

The netted carpet moth *Eustroma reticulatum* is one of the rarest moths in the UK where it now occurs only in a few sites in The Lake District of northwest England. In the late 1990's there was a decline in its larval foodplant, touch-me-not balsam *Impatiens noli-tangere*; a highly isolated netted carpet colony at Derwentwater almost certainly became locally extinct because of the extreme food shortages. Subsequently the balsam recovered and an attempt was made to reintroduce the moth to this locality by translocation of 30 larvae in September 2006. However, in September 2007 the site was surveyed for larvae, but none were found. The procedure was repeated (40 larvae translocated) in September 2007 but at an alternative site at this locality where the foodplant was more abundant and conditions were considered more favourable. In September 2008, surveys revealed four netted carpet moth larvae, considered progeny of the previous year's introduction; in order to bolster this initial success, a further 150 larvae were translocated. This movement of larger numbers of larvae was possible because of their unprecedented abundance found in the actively managed donor site. Monitoring is ongoing to ascertain the longer-term success of the translocations.

BACKGROUND

The netted carpet moth *Eustroma reticulatum* is one of the rarest moths in the UK. The species is classed as vulnerable in the Red Data Book 2 (Shirt 1987) and considered 'of greatest concern' in the UK Biodiversity Action Plan (UK BAP 2002). Within the UK, this moth is now restricted to a series of localities in only five 10 km² grid squares in The Lake District of northwest England. The yellow-green larvae feed on only one plant: touch-me-not balsam *Impatiens noli-tangere*. The balsam itself is nationally scarce, is the only native UK balsam, and it too has its stronghold in the Lake District. Preferring damp, shaded woodland it thrives in areas with some soil disturbance and open, competition-free ground for germination.

The Derwentwater colonies of netted carpet were among the earliest reported in Britain (c.1897) and they were recorded intermittently until the 1990's. In the late 1990's there was a widespread decline in stands of the larval foodplant, probably related to a run of very mild winters leading to poor germination.

Balsam decline inevitably led to a crash of netted carpet moth numbers and, despite annual searches, none had been seen here since 1999. The Derwentwater colony was highly isolated (15 km from any other), and almost certainly became locally extinct because of the extreme food shortages. The moths were unlikely to naturally recolonise Derwentwater because it was so isolated. Subsequent to its dramatic decline the touch-me-not balsam successfully regenerated to its previous levels. The locality was believed to be prime netted carpet moth habitat again, and the time was deemed suitable to consider a reintroduction to Derwentwater.

ACTION

Reintroduction procedure:

- 1) A donor site, Coniston Water, was identified. This was deemed most suitable by the Netted Carpet Moth Steering Group as there had been high larval counts during the previous two years due to the National Trust's

- winter cattle grazing providing excellent soil conditions for balsam regeneration (Table 1).
- 2) The necessary legal permissions from English Nature (now Natural England), Butterfly Conservation and The National Trust were obtained. The Steering Group developed a plan for the reintroduction, and set parameters to determine whether the Coniston Water donor site was strong enough and the Derwentwater receptor site (Ordnance Survey grid ref. NY 2521) was suitable.
 - 3) In early Sept 2006 the receptor site was again surveyed (to ensure that no larvae were present), and the donor site surveyed to check larval abundance. It was agreed that a minimum of 20 and a maximum of 30 larvae could be taken, and that no more than 15% of larvae found at the donor site would be relocated. If less larvae were found during 2006 than were present in 2005 (150 actual, 350 estimate) then the reintroduction would not be carried out.
 - 4) As more larvae were found than the 2005 count, a total of 30 were removed from the donor site. Large larvae (third or fourth instar) were preferentially collected and then carefully transported in plastic boxes containing paper tissue and some of their foodplant
 - 5) Within a few hours the larvae were translocated onto the touch-me-not balsam plants at Derwentwater, being gently and patiently encouraged to attach to a new foodplant, helped by a soft paintbrush.

Monitoring: An annual survey of netted carpet moth sites in the Lake District takes place using a larval counting method undertaken by experienced surveyors. Larvae are searched for on the foodplant, often by turning over the top of the plant or individual branches in order to view the underside of leaves and the seed pods, which is where larvae are normally found. Where the plants are dense, and in order to avoid damage to the stand, surveyors look horizontally (or thereabouts) through stems and side branches in order to search for larvae (Fig. 1). The

actual number of larvae seen is recorded but an estimated number is also calculated using the percentage of plants surveyed; the abundance of foodplant is assessed at the same time. The plant tends to occur in patches and the number in each of these is estimated by assessing plants per square metre and the area occupied. The figures for each patch are then totalled.

Table 1. Estimated numbers of touch-me-not balsam plants and netted carpet moth larvae in one of the National Trust cattle-grazed woods at Coniston Water, the donor site; all surveys conducted in late August/early September. (Source: Hooson 2008)

Year	Number of plants	Number of larvae
2000	400	12
2001	2,925	12
2002	1,120	45
2003	2,150	36
2004	12,000	375
2005	30,500	215
2006	56,000	565
2007	68,000	950
2008	20,000	1,400

Note: no grazing 2000-2002 inclusive; grazing cattle (6-10 cows for 4 weeks) were introduced mid-February 2003 (i.e. before larval/plant survey in September); cattle grazed in similar numbers every subsequent year.



Figure 1. Netted carpet moth larva as often encountered, in characteristic pose, during surveys (© Graham Jones).

CONSEQUENCES

In September 2007, a year after the initial translocation, the receptor site was thoroughly surveyed for netted carpet larvae, but none were found. The result was considered by the Steering Group, and was thought to be due to only small numbers of moth larvae having been reintroduced and the chance factors which result. They agreed that the procedure should be repeated, but at an alternative site Derwentwater at this locality where the foodplant abundance and conditions were considered more favourable. On this occasion (September 2007), very high larvae numbers (an estimated 950) at the Coniston Water donor site allowed a total of 40 (third or fourth instar) larvae to be translocated to the new Derwentwater receptor site, on the 6 September 2007.

In September 2008, the survey revealed four netted carpet moth larvae, progeny of the previous year's introduction, and likely produced from a single mated female. In order to bolster this initial success, a further 150 larvae were translocated. This large movement of larvae was possible because of the

unprecedented numbers of larvae (an estimated 1,400 in September 2008) found in the actively managed donor site.

Ongoing monitoring: The late summer-early autumn annual surveys will continue at both the donor and recipient localities, as well as the other known colonies of the netted carpet moth in the Lake District.

REFERENCES

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