

300 Word Abstract for PhD Thesis by Grace Twiston-Davies

Landscape scale habitat restoration could reconnect habitats in fragmented landscapes. This study investigates landscape connectivity as a key to effective habitat restoration in lowland agricultural landscapes and applies these findings to management recommendations.

Landscape scale chalk grassland restoration has been implemented the Stonehenge World Heritage Site, UK. Here, the species, habitat and landscape characteristics that facilitate or impede the enhancement of biodiversity and landscape connectivity were investigated.

Lepidoptera were used as indicators of success and results showed restoration grasslands approaching the ecological conditions of the target chalk grassland habitat and increasing in biodiversity values within a decade. Restoration success is apparent for species with a broad range of grass larval host plants (e.g. *Melanargia galathea*) or with intermediate mobility (e.g. *Polyommatus icarus*). However, two species with specialist larval host plants and low mobility (e.g. *Lysandra bellargus*), are restricted to chalk grassland fragments.

Lepidoptera behavioural studies indicate that recent grassland restoration (1 or 2 years old) may reduce the isolation of chalk grassland fragments and a management experiment showed that mowing increases boundary following behaviour in two species of grassland Lepidoptera; *Maniola jurtina* and *Zygaena filipendulae*.

Analysis of the landscape scale implications of the grassland restoration illustrates increased grassland habitat network size and landscape connectivity, which may benefit the majority of grassland associated Lepidoptera.

Landscape and habitat variables can be managed to increase the success of restoration projects including the spatial targeting of receptor sites, vegetation structure and selection of seed source and management recommendations are provided for this and other landscape scale grassland restoration projects.

Overall results show restoration success for some habitats and species within a decade. However, management is required for the re-colonisation of specialist species. Despite this, habitat restoration at the landscape scale can be a long term approach to enhance Lepidoptera biodiversity and landscape connectivity.