



# Global Re-introduction Perspectives: 2011

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IUCN/SSC Re-introduction Specialist Group (RSG)





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## Mottled grasshopper translocation to sand dunes in Essex, England

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### Introduction

The mottled grasshopper (*Myrmeleotettix maculatus* (Orthoptera: Acrididae)) is widely distributed, but not necessarily common, throughout mainland Britain. However, in the county of Essex (south-east England) it is rare, and included in the Essex Red Data List (ERDL; Gardiner & Harvey, 2004). The mottled grasshopper has no IUCN endangered species listing. Its habitat requirements are short, dry turf on sandy, nutrient poor soils, with the presence of bare earth essential for basking and ovipositing (Wake, 1997). The largest and most widespread Essex population of the mottled grasshopper is at Colne Point, a coastal shingle spit nature reserve, close to St. Osyth (Harvey & Gardiner, 2006). Low-lying spits such as Colne Point (the site is generally less than 1 m above MSL) are threatened by climate change induced sea level rise, therefore there is a need to move insects to more secure habitats. In 2009 a translocation was undertaken of a small number of mottled grasshopper adults from Colne Point to sand dune flood defences at the nearby town of Jaywick. Full details of the translocation can be found in Gardiner (2010), permission has been given by the editors of Conservation Evidence to reproduce parts of the article in this case study.

### Goals

- **Goal 1:** Due to the threat posed by sea level rise at Colne Point, it was decided to translocate a small number of adult mottled grasshoppers to recently created sand dune-enhanced flood defences at Jaywick on the north-east Essex coast.
- **Goal 2:** To create sand dune habitat favorable for mottled grasshoppers on tidal flood defenses in the town of Jaywick. These sand dunes should form a natural flood defense in addition to providing coastal



Mottled grasshopper (*Myrmeleotettix maculatus*) © Ted Benton

habitats lost during the 20<sup>th</sup> century that insects such as the mottled grasshopper would have inhabited.

- Goal 3: To allow the mottled grasshopper to extend its range on the north-east Essex coast.
- Goal 4: To establish a protocol for translocation of the mottled grasshopper.

## Success Indicators

- Indicator 1: Survival of the mottled grasshoppers that were released at Jaywick so that mating and egg-laying occurred in the release year.
- Indicator 2: Presence of mottled grasshopper adults in successive years after release indicating a self sustaining population on the sand dunes.
- Indicator 3: Extension of the range of the mottled grasshopper on the north-east Essex coast.
- Indicator 4: Creation of sand dunes as natural flood defenses to allow the mottled grasshopper to extend its range.
- Indicator 5: Increase in population of the mottled grasshopper in successive years after release.

## Project Summary

**Feasibility:** Due to the threat posed by sea level rise at Colne Point, it was decided to translocate a small number of adult mottled grasshoppers to recently created sand dune-enhanced flood defences at Jaywick. The Jaywick flood defences fall within the former range of the grasshopper, which was recorded near Clacton-on-Sea in about 1900 (Wake, 1997). The populations of this grasshopper at Colne Point are only 2.7 km from the proposed release site at Jaywick. However, given the sedentary nature of the mottled grasshopper (Wake, 1997) and the unfavourable habitats between the two sites (sections of hard engineered flood wall with no vegetation), it was deemed that a translocation of this insect was the only feasible way that it might establish in the emerging dunes. Since 1986 at Jaywick, a number of projects have been undertaken to tackle the threat of tidal flooding. Combined with the installation of breakwaters to stabilise existing sand, the Environment Agency (EA) has undertaken a beach recharge project. From September 2008 to January 2009, sand was added and spread by bulldozers to re-profile the beach. To create more natural looking flood defences in front of the existing concrete revetment, stands of marram grass (*Ammophila arenaria*) have been planted. It is hoped that these will promote sand accretion and develop into a linear corridor of sand dune vegetation with slacks and hummocks stretching over 1 km in length. Because of this habitat creation, it was decided to translocate the grasshopper to the dunes so that it would have the chance to spread eastwards through the newly planted marram plots, which should provide a large interconnected area of favourable habitat.

Colne Point (the donor site) is the largest shingle spit in Essex (c. 280 ha) and is a nature reserve managed by Essex Wildlife Trust (EWT). It has extensive dunes and a shingle ridge enclosing an area of salt marsh. There are large areas of lichen heath and shrubby sea-blite *Suaeda vera*. The area from which the mottled grasshopper adults (donor stock) were taken (Ordnance Survey (OS) grid

reference TM 098124) was largely unvegetated shingle with patches of shrubby sea-blite.

Following the principles of insect translocation guidelines, the receptor site at Jaywick was very carefully chosen. Given that this grasshopper requires habitats with a high amount of bare ground, suitable habitat was selected at Jaywick behind a breakwater, the installation of which led to stabilisation of the sand behind it. The release site



Jaywick release site © Tim Gardiner

comprised a 1 ha area of emerging sand dune with marram, situated behind the breakwater (OS grid reference TM 139126). Nine fenced plots (each approximately 300 m<sup>2</sup>) containing densely planted marram were situated 200 m to the east of the release site.

**Implementation:** On 31<sup>st</sup> July 2009, 15 female and 15 male adult mottled grasshoppers were collected using a sweep net (30 cm diameter) and transferred into transparent plastic containers (approx. 20 cm x 10 cm in size, no vegetation was provided, about four adults per container) for transit by road to the Jaywick release site. Care was taken to ensure that adults transferred were in good condition (i.e. did not have any legs missing or body damage). Inevitably, a very small number (< 5) were damaged while sweeping; these were released at the site of capture. Once at the receptor site, the adults were released from the containers into suitable dune habitat. The adults were translocated in two batches to keep the time held in the containers to no longer than 2 hours; between 10:00 hrs and 13:00 hrs (10 female:8 male), and 14:00 hrs and 16:00 hrs (5 female:7 male). The hot weather made grasshopper capture very time consuming due to the high activity levels, therefore it was only possible to collect 30 adults in 5 hrs. Due to this slow rate of capture, a further day was needed to catch and move the last 10 adults. The desired number of target individuals were captured on 3<sup>rd</sup> August 2009 (5 female:5 male), and transferred and released between 11:00 hrs and 13:00 hrs.

**Post-release monitoring:** Four stridulating males were heard on 18<sup>th</sup> August 2009 at Jaywick flood defences. This indicated that adults had remained in the immediate vicinity of the release site. During the survey on 23<sup>rd</sup> June 2010, 3 adult males and 4 adult females were located, indicating that mating in late summer 2009 at Jaywick had occurred, and that eggs were laid and successfully overwintered. Hatching and maturation must have occurred in spring 2010, leading to the establishment of a small breeding population. The small numbers of

# Invertebrates

individuals observed in 2010 indicated that the initial breeding success at the receptor site may have been very low. However, on 15<sup>th</sup> June 2011, approximately two years after release, 5 adult males and 11 females were seen, suggesting a population increase from the previous summer.

## Major difficulties faced

- Hot weather (air temperature 24° C) made grasshopper capture very time consuming due to the high level of insect activity. The sweep net used to catch grasshoppers was very ineffective as they frequently escaped capture, I suggest using a glass tube to place over the top of grasshoppers on the ground as they stay relatively still in response to this.
- No published evidence of previous translocations of grasshoppers in the UK could be found; therefore the methods used were devised by the author. There was also no evidence to suggest that moving grasshoppers would lead to the successful establishment of a new population at the receptor site.
- The receptor site has a high level of public activity due to its use as a beach in summer, therefore disturbance to the released grasshoppers could be potentially high interfering with breeding.
- Due to time constraints on the project, only a small number of grasshoppers could be moved (40), this appeared to lead to a small number of adults in the post release year, suggesting mating success had been low. Due to the possibility of inbreeding depression it may be useful to supplement an established population at Jaywick with small numbers of individuals from Colne Point in future years to enhance genetic diversity.

## Major lessons learned

- Use a large number of insects in the initial release (e.g. more than 40) to establish a larger population at the receptor site.
- If only a small number of insects can be released then these should be supplemented with extra individuals in future years to prevent possible inbreeding depression.
- Use glass tubes to capture grasshoppers, these are apparently more effective as they lead to less escape movements than sweep netting.
- Ensure that the release habitat has a large area of exposed, unvegetated sand/shingle (e.g. 60 - 70%) and is similar to the donor site.

## Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

## Reason(s) for success:

- Number of adult grasshoppers released was large enough to establish a small breeding population that has persisted for two years (generations).
- Habitat at receptor site was similar to the donor site (e.g. plenty of unvegetated sand/shingle).

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