



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Restoring the endangered pine hoverfly in the UK

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Introduction

The endangered status of the pine hoverfly (*Blera fallax*) (Diptera, Syrphidae) was confirmed in 1999 after a 12 year investigation (Rotheray & MacGowan, 2000). The study concluded that the species had probably existed in the British Isles for several millennia, but that in the last hundred years it had declined in distribution from eight to just two known sites, both confined to the central highlands of Scotland. In 1999, the pine hoverfly was listed in the UK Red Data Book as category 1 (endangered), it is also a UK Biodiversity Action Plan priority species, and is one of 32 species listed in the Species Action Framework (2007), a Scottish Natural Heritage (SNH) initiative which focuses on improving the status of species deemed significant to overall Scottish biodiversity. Very little is known about the ecology of the pine hoverfly. In particular the elusive adults are very difficult to find; during the 12 year study no adults were observed (Rotheray & MacGowan, 2000). However breeding sites were identified where larval stages could be found and intervention is essential if we wish to safeguard UK populations of this species. In 2008 the first attempts were made to re-locate the pine hoverfly to its historic sites in Scotland.

Goals

- Goal 1: Identify at least two potential re-location sites within the species' historic range.
- Goal 2: Increase breeding resources at re-location sites.
- Goal 3: Establish populations of pine hoverflies at two re-location sites.
- Goal 4: Carry out annual monitoring to record progress and prepare additional sites to link populations.

Success Indicators

- Indicator 1: Self-sustaining populations established at re-location sites.
- Indicator 2: Distribution of the pine hoverfly extended in Scotland.

Project Summary

Feasibility: In Scotland the Pine hoverfly's preferred habitat is Scots pine (*Pinus sylvestris*). It is a specialist saprophage: it develops in rotting pine stumps. Heart rot



Pine hoverfly (*Blera fallax*)

fungus (*Phaeolus schweinitzi*) attacks the centre of the tree causing it to weaken, fall and snap at the base revealing a hole that fills with rain water, and it is in this cavity that the larvae filter feed. Currently in Scotland this micro-habitat is rarely found in native pine woodlands due to a lack of veteran and senescent trees. The remaining populations survive in non-native plantations where rot-holes are formed in pine stumps left vulnerable to decay after felling. It is possible to create breeding sites by boring holes in stumps, filling them with pine chips or sawdust and allowing the rain to fill the cavity. Habitat creation in this way began in the 90's and proved successful for a closely related species, *Callicera rufa* (MacGowan, 1994). In 2003, the same methods were used at pine hoverfly sites and by the following year it was confirmed to have been similarly effective (Rotheray, 2006). Due to these simple, swift and inexpensive methods of management, re-locating this species to historic sites in Scotland is a practical option which appeals to site owners and managers alike. The pinewood sites proposed for re-location are historic sites for the pine hoverfly with a characteristic ground flora and associated shrubs. These plants, particularly rowan (*Sorbus aucuparia*) provide food for adults in the form of pollen and nectar. At these sites, the pine wood habitat has improved since the last records of the pine hoverfly due to the positive management actions under the influence of the SSSI (Sites of Special Scientific Interest) and SAC (Special Areas for Conservation) designations which cover the sites. Both sites have included provision of artificially created rot-holes as part of their agreed long term forest planning.

Implementation: The number of individuals to be released at re-location sites is under investigation and the implementation process is being developed and agreed between the BAP coordination group and the Species Action Framework management group. Rather than directly transferring individuals from one site to another, in June 2009 an attempt to captive breed the pine hoverfly was made. This species had never previously been bred in captivity and this type of re-location of a saproxylic insect has never been attempted anywhere in the world. In November 2008, fifty larvae were removed from the wild and reared in captivity

in jars filled with water and pine wood chips. In June 2009, thirty eight of them emerged as adults and were split between one large on-site cage (designed to observe adult behaviour in a more natural setting) and four small indoor cages. Over a period of two months the captive adults were successfully fed on pine woodland associated flora, mated in on-site and indoor cages, and several females oviposited a total of about 460 eggs, of which roughly 300



Creating habitat by creating bore-holes

larvae have survived to date. Although both cage methods were successful, the smaller indoor cages are considered more advantageous due to the greater amount of control, protection and ease of assembly. In October 2009, 85 of the captive bred larvae that had reached the final stage in development were transferred to 28 bored stumps at one of the new sites where three groups of 30 bored stumps had been created within a kilometre of each other. In June 2010, 95 adults were released at the same site and the remainder entered into a second generation of captive breeding. To avoid inbreeding and 2nd generation habituation (adaptation to captive conditions) individuals from the original site were included in captive breeding efforts during 2010. Although recent surveys show that the removal of 50 larvae from the original population has not had a measurable negative affect on the population, it is proposed that of the captive bred stock 50 adults will be released at the original site in 2011 to supplement the population.



Captive rearing hoverfly larvae

Post-release monitoring: The relocation site is being monitored monthly and each larva that is located is photographed to follow development. Sixty percent of the released larvae were found in the cut stump holes four weeks after release. Eight weeks after release, a total of 15% were located in the holes. It is known that during winter, fully developed larvae of the pine hoverfly tend to move out of the water and into leaf litter on the ground or into deep cracks in the stumps where they are very hard to locate, while smaller larvae remain in the holes and complete their development in spring. This may explain the low numbers of larvae remaining in holes. In August 2010, 43 new pine hoverfly larvae were found in 12 stump holes we created, four of which were 1 km away from the site they were released.

Major difficulties faced

- Because of the lack of scientific research on the ecology of this species, in particular the adult requirements for feeding and breeding, much of the project involved trial and error.
- Lack of large pine stumps for habitat creation (holes cut in small stumps tend to only temporarily hold water).

Major lessons learned

- New understanding of insect husbandry, in particular the ability to rear adult flies in small indoor cages while utilising large outdoor cages to investigate pine hoverfly behaviour.

Invertebrates

Success of project

Highly Successful	Successful	Partially Successful	Failure
		√	

Reason(s) for success/failure:

- Having started in November 2008, the re-location of the pine hoverfly is in its early stages. As yet we do not know if the population at the relocation site will establish itself, however having found a new generation of larvae there, this has been taken as an indicator of success at this preliminary stage.

References

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