Dipterists Digest 2023 **30,** 21-24

The aspen hoverfly *Hammerschmidtia ferruginea* (Fallén) (Diptera, Syrphidae) in Deeside

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Summary
After a gap of some 30 years the presence of the aspen hoverfly, *Hammerschmidtia ferruginea* (Fallén,1817), is confirmed in Deeside, Aberdeenshire. The methods used to re-establish the population are discussed.

Introduction

The aspen hoverfly *Hammerschmidtia ferruginea* (Fallén, 1817) is a saproxylic species which is reliant on a regular supply of large, over 25cm diameter, fallen aspen (*Populus tremula,* Salicaceae) to sustain its larvae (Rotheray *et al*. 2009). Previously only known in Britain from a few Scottish records, the first comprehensive survey of the aspen hoverfly was carried out in 1990 (MacGowan 1990). This report found that the British population is centred in Strathspey, with several smaller, more isolated, populations along the River Findhorn, Loch Ness-side, south-east Sutherland and on Deeside. Since that time the aspen hoverfly has been intensively studied and monitored in Strathspey, with adults or larvae also being recorded at relatively regular intervals at the smaller outlying sites.

The exception to this is Deeside. One larva was observed in wet decaying cambium below the bark of a large fallen aspen in Dinnet Oak Wood SSSI (NO4697) by Graham Rotheray and myself in 1990; the specimen was not retained and no photograph was taken. Apart from this record, the species has not been seen in Deeside since that date. The Dinnet site comprised a rather small stand of aspen in what was primarily an oak wood. However, it is situated some 3.5km SE of the largest aspen stand in Deeside at Muir of Dinnet NNR (NO4399), a distance which is well within the dispersal range of the aspen hoverfly (Rotheray *et al*. 2014).

As part of a national review of all known aspen hoverfly sites, Rotheray (2006) included details of survey work undertaken at Dinnet Oak Wood and Muir of Dinnet in 1999, 2003 and 2005. It revealed that, as expected, the small Dinnet aspen stand did not produce the continuity of large dead aspen which is required to sustain aspen hoverfly populations. Although two dead trees of suitable size and state of decay were found in 1999, there were none in 2003 or 2005. In contrast, the Muir of Dinnet site, with an estimated 9.5ha of aspen, contained seven, five and two pieces of suitable decaying wood in these respective years. A larger amount of suitably-sized fresh dead wood was also available at this site to maintain the resource into the future. Despite almost annual visits to Muir of Dinnet since 2005 and to many of the other larger aspen stands along the 30km of the River Dee between Dinnet and Braemar, no further adults or larvae of the aspen hoverfly were ever found. The larvae and puparia of this species are not too difficult to locate once the micro-habitat of decaying cambium in large fallen aspen is known. Similarly, the adults are relatively obvious when feeding on the flowers of trees such as rowan and bird cherry in early summer. However, after a period of nearly 30 years without a confirmed sighting of the aspen hoverfly in Deeside, the conclusion was reached that the species had become locally extinct.

The most likely reason for the local extinction would seem to have been a break in the continuity of large dead aspen available in the area, perhaps due to past management which had reduced the number of large trees, inhibited regeneration and increased the isolation of stands.

Influencing factors in re-instating the population

It was considered that climatic factors in Deeside were likely to be favourable for the hoverfly. The area is one of the most "continental" areas of Scotland with relatively lower rainfall, higher sunshine and lower winter temperatures than most of the country. As such it is well suited to many species of boreal woodland insects, many of which, like the aspen hoverfly, are more common in Scandinavia. Since the aspen hoverfly was last seen in Deeside, the Cairngorms National Park has been established, in 2003. The Park area includes not only all of the Strathspey aspen sites, but also all those in Deeside. The National Park has promoted the expansion of native woodlands and has also highlighted the importance of aspen within the Park, with several initiatives in place to regenerate existing aspen stands or to plant in appropriate areas. The aspen stand at Muir of Dinnet has also matured and expanded over the last 30 years under a policy of encouraging woodland regeneration. It was against this background that the conditions seemed favourable to bring the aspen hoverfly back to Deeside.

Fig 1. Large standing and fallen aspen at Muir of Dinnet NNR, May 2019.

In early 2019, I visited the Muir of Dinnet site with SNH staff, including the reserve officer. We assessed the capability of the site to provide sufficient habitat for aspen hoverfly larvae at that time and into the foreseeable future (Fig. 1). We were all in agreement that, based on the experience gained of working with this species in Strathspey, the conditions were favourable for bringing the species into the site. Subsequently the relevant consents were obtained from SNH to allow this action to take place. This proposal was also endorsed by the Hoverfly Steering Group, with advice on conservation efforts relating to the aspen hoverfly and also to the pine hoverfly *Blera fallax* (Linnaeus, 1758).

Fig. 2. Sandwich box containing puparia in position below a large fallen aspen.

Establishing the population

In spring 2019 there was a substantial amount of large decaying aspen present in Strathspey, and accordingly on 1 May twelve puparia were collected, eight from two aspen logs at a site north of Aviemore and four from a single log at a site near Alvie. The puparia were found in areas of dry cambium adjacent to the wet decay in which the larvae had developed. These were placed in a plastic sandwich box along with sections of the material in which they were found. On 5 May the sandwich box, with the lid taped approximately 2cm open to allow emerging adults to escape, was placed below a large fallen aspen at Muir of Dinnet (Fig. 2). This particular tree was over 25cm in diameter and was estimated to have been dead for approximately 18 months, as patches of wet decaying cambium were forming under the bark. Other suitable large decaying trees were in the vicinity.

The intention was to revisit the aspen stand in the spring of 2020 to look for any resulting larvae or adults, but this had to be put on hold due to the restrictions of the Covid pandemic, a situation which persisted into 2021. It was not until 10 June 2022 that the site was next visited, and I was pleased to find eight adults feeding on rowan and elder flowers on the edge of the aspen stand (Fig. 3). No doubt there were other individuals in the vicinity which were not observed. Whilst there is of course the possibility that these individuals originated from an undetected population which had persisted in the area, it seems more probable that they were descendants of the flies that emerged from puparia introduced in 2019. If this is the case, the aspen hoverfly had gone through three entire generations since the puparia were placed in the site in the spring of 2019, indicating that the conditions were favourable for sustaining a population.

Fig. 3. A male aspen hoverfly feeding on elder flower. Muir of Dinnet NNR, June 2022.

It is hoped that the establishment of this new population will act as a locus from which further expansion of the aspen hoverfly into the Deeside aspen stands can be achieved and, in time, facilitate the establishment of a viable metapopulation in the area.

Acknowledgement
Thanks to Graham Rotheray for comments on a draft.

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