

Responses of Diptera to woodland creation

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Woodland Creation & Ecological Networks



Local-scale attributes determine the suitability of woodland creation sites for Diptera

STUDY OVERVIEW

The larvae and adults of hoverflies and craneflies play an important role in the ecosystem through performing functions such as decomposition and pollination.

Whether a species can colonise a new woodland, and persist once established, is likely to be influenced by the characteristics of the woodland, the wider landscape, and the dispersal ability of the organism.

78 woodlands were surveyed for a total of 3 weeks each, using malaise traps in 2 study areas (Scotland and England) during 2015 (Fig. 1).



Fig. 1. The lead author inspects a malaise trap

RECOMMENDATIONS & CONCLUSIONS

Secondary woodlands in this study are providing habitat for woodland insects despite their small and fragmented configuration.

However, the low abundance of woodland hoverfly suggests that the habitat quality or surrounding landscape is not suitable for large populations of these insects to persist.

Whilst we found few effects of woodland character on craneflies, hoverflies would benefit from conservation actions to **improve the quality and structure within woodland habitats**, specifically:

- Encourage active woodland management, such as **thinning woodlands once they are established** to allow trees to grow and natural regeneration to occur.
- **Maintaining open spaces** within glades or rides.
- These simple management strategies are likely to facilitate a diverse tree and understory vegetation structure.

We did not find any effects of the surrounding landscape here, but acknowledge that other studies have identified the importance of woodland cover and connectivity.

Future work will use finer-scale data (e.g. hedgerows and individual trees) to determine how these contribute to the use of woodlands by wildlife.

RESULTS HIGHLIGHTS

1298 hoverflies of 81 species, and 4607 craneflies of 112 species were sampled.

Of these, 25 hoverfly and 67 cranefly species are considered woodland-dependent. This represents 27% and 33% of all woodland-dependent hoverfly and cranefly species (respectively) found in Britain (Figs 2 & 3).



Fig. 2. *Xylota sylvorum*, a woodland-associated species. ME Talbot

The abundance of woodland-associated hoverflies sampled compared to the total catch was low (approx. 10%)

In contrast, the abundance of woodland-associated craneflies sampled compared to the total catch was high (79% in England, 57% in Scotland)



Fig. 3. *Limonia nigropunctata*, a woodland-associated cranefly. G Mainguy

Structural equation models were used to examine direct and indirect relationships between site-level and landscape variables, hypothesised to influence woodland-associated hoverflies and craneflies (Fig 3).

Only **woodland vegetation characteristics influenced either group** with no effect of the surrounding landscape detected (Fig 3).

Older woodlands with more understorey cover and greater variation in tree size had a higher abundance and diversity of hoverflies.

Surprisingly, there also appeared to be direct negative effects of 1) woodland age, likely to be the result of newer plantings containing a greater diversity of tree species, and 2) and woody debris.

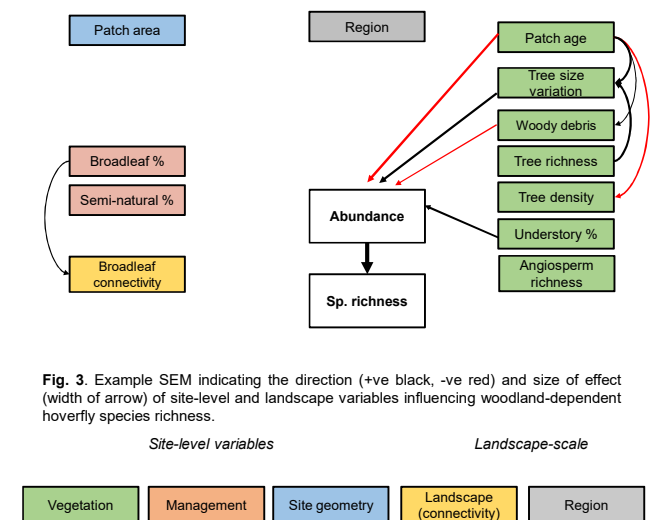


Fig. 3. Example SEM indicating the direction (+ve black, -ve red) and size of effect (width of arrow) of site-level and landscape variables influencing woodland-dependent hoverfly species richness.



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