Hoverflies and climate change - making sense of trends

Roger Morris[*][†][1] and Stuart Ball[*][1]

[1]Hoverfly Recording Scheme – United Kingdom

Abstract

Evidence of substantial declines in both the abundance and biomass of invertebrates is now incontrovertible, with important results generated from several data sources in northern Europe. The effects on 'pollinator' populations gain particular attention, and as such there is a lot of interest in what is happening to the Syrphidae. Possible reasons for these trends include traditional reasons such as agricultural intensification and pesticide usage. We suspect, however, that whilst these have been important drivers of invertebrate declines, other factors are likely to be increasingly influential.

Climate change is the big unknown. It is relatively easy to link climate warming to range expansion in some species such as at least two *Volucella*; it is far harder to explain why other species' range or abundance is changing. Detecting these changes is problematic because very few datasets exist, and those that are available have not been assembled in a way that allows direct linkage to climate variables. Nevertheless, we believe that many species that are responding negatively to climate change. Using examples, we highlight the potential importance of the Syrphidae as the focus of research. The tremendous range of larval lifestyles is an important consideration in this respect.

In this presentation, we construct a conceptual model based on Syrphid life-histories to explain at least some of the changes that have been detected in invertebrate abundance. Our model emphasises the importance of extreme events as the driver of change. We liken them to 'death by a thousand cuts', placing the greatest emphasis on heatwaves and droughts, whilst recognising that other extreme weather such as warm winters and flash flooding will (at least) have localised effects.

Keywords: Decline, climate change, conceptual model, larval biology

[*]Speaker
[†]Corresponding author: syrphid58@gmail.com