Syrphidae-decline evaluated after 43 years monitoring in a Dutch forest

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Abstract

Abstract - Monitoring of hoverflies in a Dutch forest, surrounded by other forests, in the period 1979-2021 facilitates an evaluation of abundance and diversity in Syrphidae at this undisturbed location. Data collection (n=280) was standardised with a fixed route during most years in April-September. The mixed deciduous-conifer forest has an undergrowth of mainly *Vaccinium* and it is a representative of the dry forests with acidic soil in the region. Between 1982 and 2021, total hoverfly abundance decreased by 80%. Until 1990, abundance showed a strong decrease of 10.9% per year, mainly in nationally rare species with carnivorous larvae exposed to air. From 1990, abundance stabilised, whereas from 2000 till 2021, a second period of strong decline of 9.0% per year occurred, this time mainly in very common species, also those with aquatic larvae.

Species richness also declined strongly between 1979 and 2021: the total number of species observed in five monitoring days dropped by 44% over those 43 years. The characteristic set of dry-forest hoverfly species (e.g. *Dasysyrphus, Parasyrphus, Chrysotoxum*) disappeared over four decades.
The number of nationally rare species observed at the study site declined from 19 to 9 early on, in a period (1979–1984) that coincided with intense nitrogen input and acidification caused by agriculture 5-30 km from this region. The more recent decline is likely also caused by factors from outside the forest, as forest management and conditions remained constant. Continued influx of nutrients and pesticides at a regional level, as well as climate change are possible causes of the decline.

Keywords: decreased diversity, defaunation, forest, insect decline

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