

P2 6: Abundance and seasonality of biting midges at a continental scale in Europe

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Background:

Culicoides biting midges are hematophagous insects of veterinary importance able to transmit viruses such as bluetongue virus and Schmallenberg virus to livestock. The aim of this work was to describe the average temporal abundance of biting midges at a continental scale, by comparing the seasonal variation at six different latitude ranges from southern Spain to northern Sweden.

Materials and methods:

We gathered *Culicoides obsoletus* group trap data collected by national surveillance programs in nine European countries (Spain, France Germany, Switzerland, Austria, Denmark, Sweden, Norway, Poland) from 2007-2013. In total, 904 farms were sampled for *Culicoides* midges using UV light traps. We divided Europe into 6 latitudinal bands of 5° width and calculated the average weekly midge abundance as well as the average annual cumulative sum of biting midges for each of these bands. We plotted the results to visualize the spatial and temporal patterns at a continental scale.

Results:

The midge season began earlier in southern Europe (week 10) compared to northern latitudes (week 19). The season also lasted longer at southern latitudes and became progressively shorter towards the northern latitudes. Abundance peaks occurred during spring and summer at all six latitudinal ranges. Despite the steadily shorter vector season in the north of Europe, the annual cumulative sum of biting midges increased towards the north. Norway and Sweden with the shortest vector periods, had the highest number of the *C. obsoletus* group, reaching a cumulative sum of 455.000 midges on average annually, with some traps collecting more than 110.000 in one night.

Discussion:

Temperature drives the start and length of the midge season at different latitudes, but it does not seem to drive the increasing abundance towards the north. A possible explanation could be that midge abundance may be more related to breeding site availability and soil moisture than temperature.

Conclusion:

This is the first time quantitative seasonal abundances for biting midges have been aggregated and jointly analyzed for the whole of Western Europe. By ignoring the fine scale variation in abundance between farms and regions, we have isolated and quantified an overall south-north trend in the temporal abundance of biting midges. These results may facilitate decision making by e.g. the EU member states when objectives and joint decisions are needed for prevention and control of midge-borne infections on a continental scale.