

FLYING INSECT FAUNA OF HOSPITALS

¹MATTHEW P. DAVIES, ¹MORAY ANDERSON & ²ANTHONY C. HILTON

¹Killgerm Chemicals Ltd, Wakefield Road, Ossett, WF5 9AJ

²School of Life & Health Sciences, Aston University, Birmingham, B4 7ET, UK

Matthew.Davies@killgerm.com



Introduction

Houseflies *Musca domestica* have been highlighted as realistic vectors of *Clostridium difficile* in hospitals (Davies et al., 2016). Flying insects associated with certain UK hospitals were collected and identified in order to classify, enumerate and establish the seasonality and location of such insects, to better inform pest management measures in these premises.

Materials & Methods

Flying insects were collected from pre-existing ultra-violet (UV) light flytraps in the form of Electronic Fly Killers (EFKs) and professional sticky traps located throughout seven hospitals over an 18 month period.

The samples were identified to species where possible and to genus or family otherwise, by using a dissecting microscope and entomological references.

Results & Discussion

A total of 19,937 individual insects (and other arthropods) were collected, with 114 species represented.

True flies of the order Diptera were the most commonly identified of all insect (and other arthropod) orders sampled from hospitals, accounting for 76.3% of all samples (Figure 1).

Non-biting midges of the family Chironomidae were the most commonly encountered flies, accounting for 55.5% of all Diptera samples from hospitals. Blowflies of the family Calliphoridae were the most common synanthropic fly, comprising 13.6% of all Diptera samples. Seven families of 'drain flies' contribute collectively to 22.8% of all Diptera sampled from hospitals. Houseflies (Muscidae) were surprisingly low at 0.9% of all Diptera (Figure 2).

Flies (Order Diptera) were the most abundant insect Order in all seasons, peaking in spring, being second highest in autumn, third highest in summer and lowest in winter (Figure 3).

Locations that insects were sampled from in the current study included ward kitchens, catering units, cafés, café kitchens, restaurants, coffee shops, cooked food stores, dry food stores, raw food stores, reception areas, laundry, leisure centre, maternity wing, neonatal, mental health wing kitchens, mortuary, nursery, patient hotel kitchen, plant room, theatre waiting room, wards, ward toilets and a workers room.



Non-biting midge, Chironomidae. The most common fly in UK hospitals. Joseph Berger, Bugwood.org



Psychoda sp., Psychodidae. The most common 'drain fly' in UK hospitals. Whitney Cranshaw, Bugwood.org



Calliphora vicina, blowfly, Calliphoridae. The most common synanthropic fly in UK hospitals. Gary Alpert, Harvard University, Bugwood.org

Arthropod orders sampled from hospitals

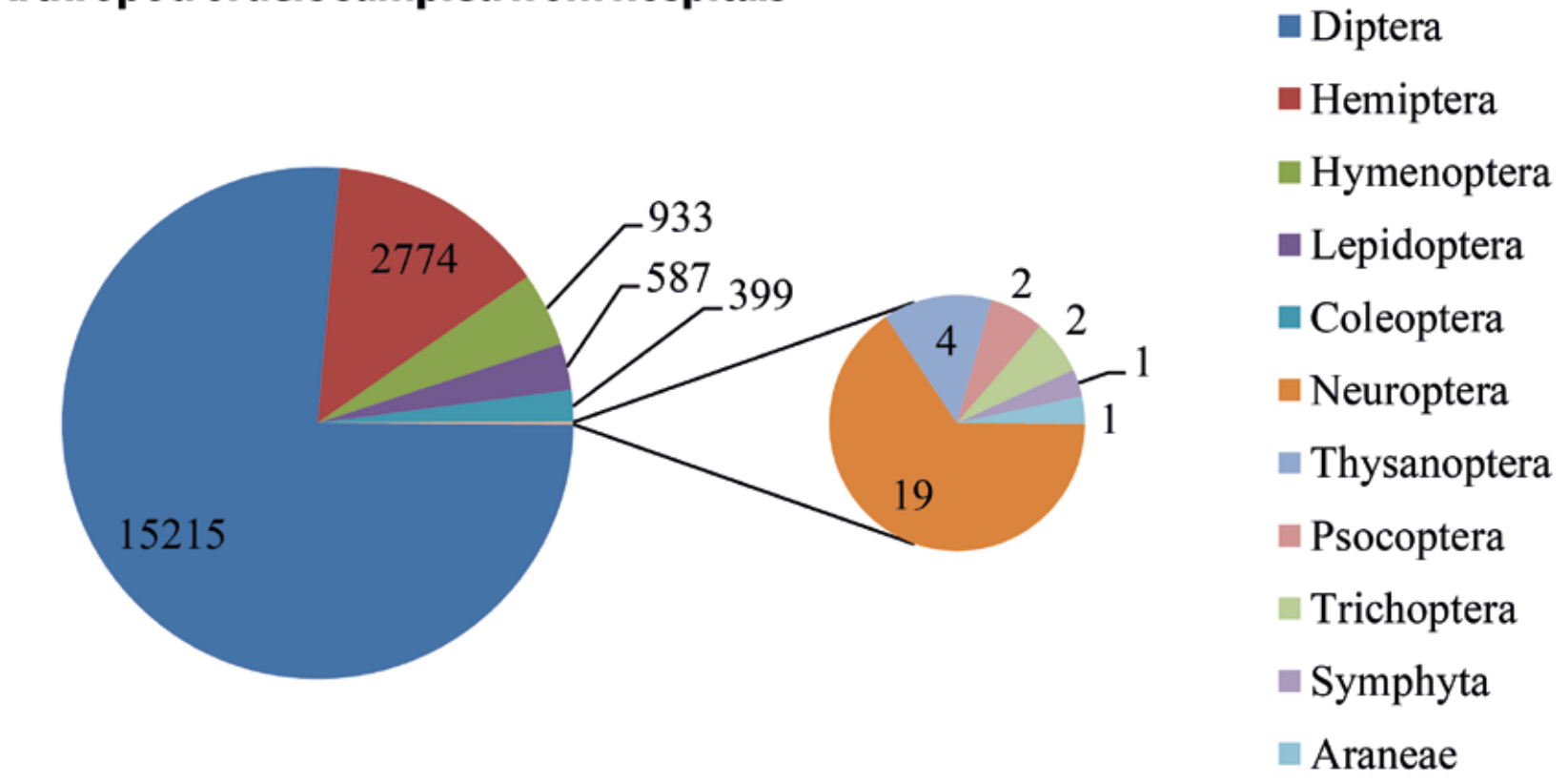


Figure 1. Arthropod orders sampled from seven UK hospital sites over an 18 month period, including numbers of individuals and percentages.

Diptera families sampled from hospitals

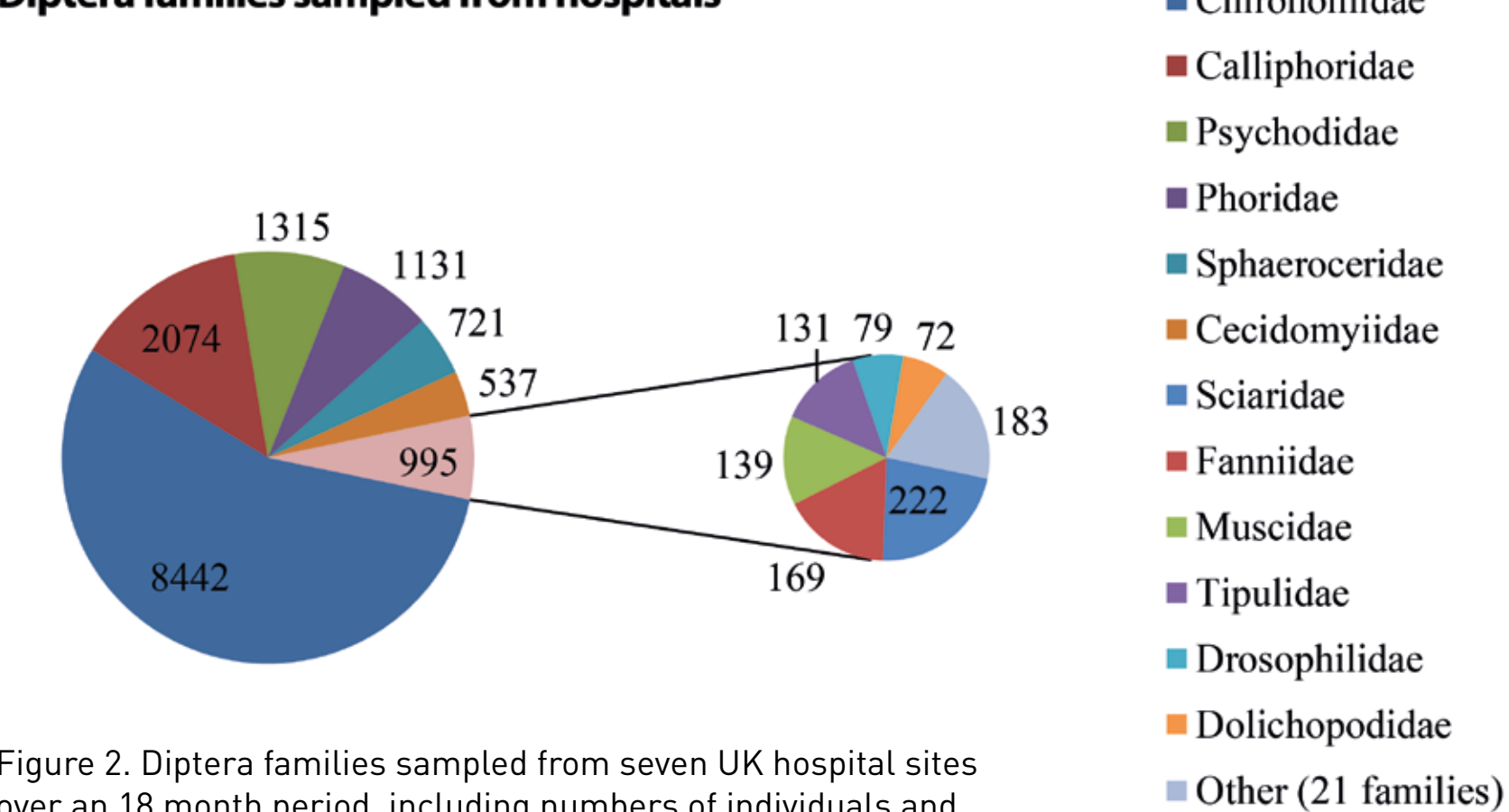


Figure 2. Diptera families sampled from seven UK hospital sites over an 18 month period, including numbers of individuals and percentages.

Seasonality of the five most abundant insect orders in hospitals

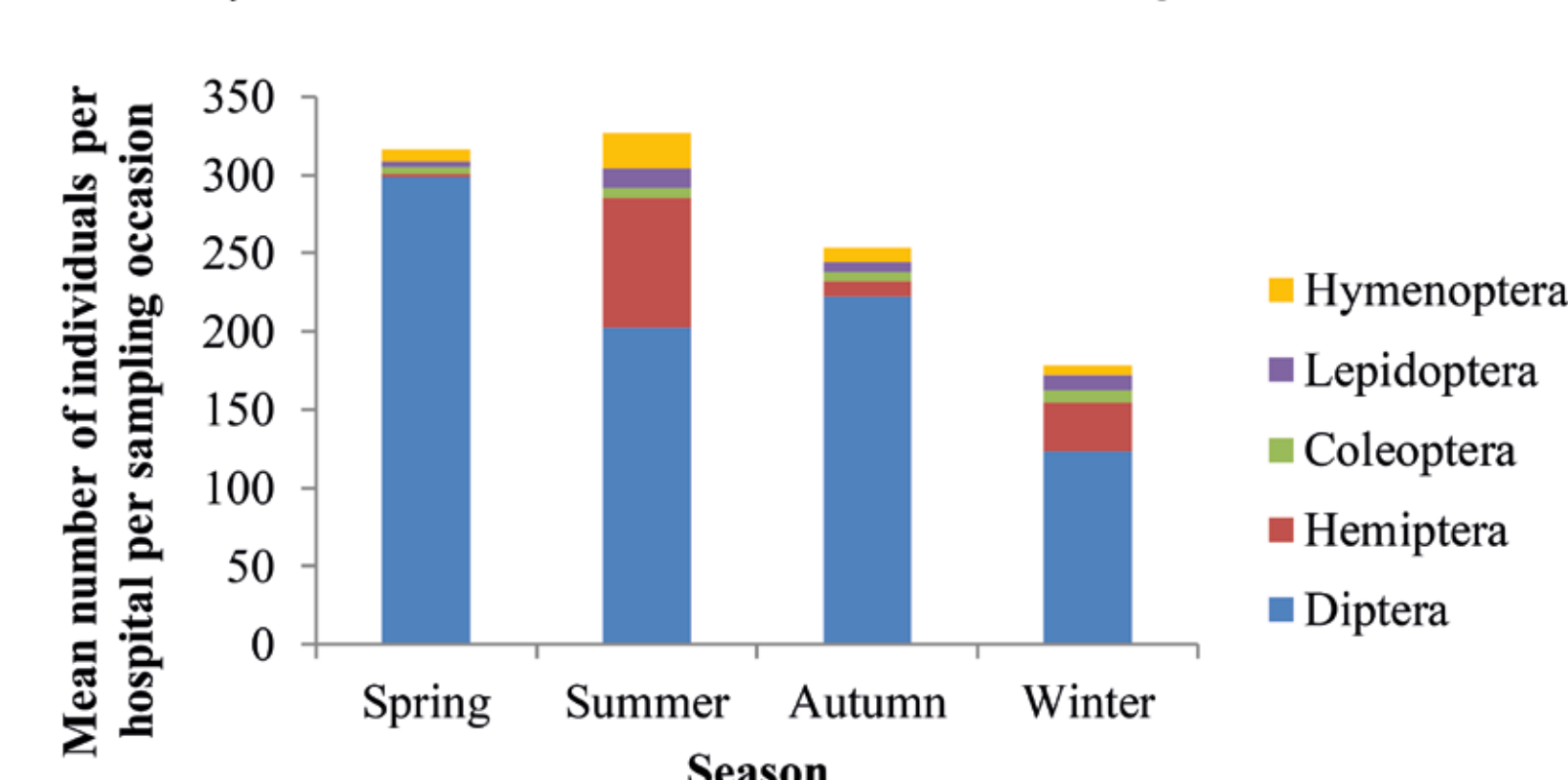


Figure 3. Seasonality of the five most abundant insect orders in hospitals, sampled from seven UK hospitals over an 18 month period.

Conclusions

This work provides pest control and infection control staff with knowledge of the key flying insect species that are likely to be present in hospitals at certain times of year and in which hospital locations. This knowledge better informs the design of integrated flying insect management programs, in order to minimise the risk of disease transmission by flying insects, with pest control central to infection control. Chironomidae were the most common flies by far and are of public health significance, while Calliphoridae were the most common synanthropic flies. Houseflies were unexpectedly low in numbers, whereas 'drain flies' were surprisingly numerous and represent an emerging problem in hospitals.

Further research

Begin field sampling and microbiological analysis of crawling insects not in this study (e.g. cockroaches), to further determine the threat to public health and in more detail consider pest control as an integral part of infection control.

References

Davies, M.P., M. Anderson, and A.C. Hilton. 2016. The housefly *Musca domestica* as a mechanical vector of *Clostridium difficile*. *Journal of Hospital Infection* 94: 263-267.

