

MUSCA DOMESTICA* (DIPTERA: MUSCIDAE) AND THE TRANSFER OF *CLOSTRIDIUM DIFFICILE

**¹MATTHEW DAVIES, ¹ANTHONY C. HILTON,
AND ²MORAY ANDERSON**

¹School of Life & Health Sciences, Aston University, Birmingham, B4 7ET, UK

²Killgerm Chemicals Ltd, Wakefield Road, Ossett, WF5 9AJ

e-mail: daviesmp@aston.ac.uk

The housefly, *Musca domestica* L., is a synanthropic, endophilous, cosmopolitan fly, which has a propensity to breed in faecal matter, moves indiscriminately from filth to food and harbours pathogenic bacteria obtained from various unsanitary sources. *M. domestica* has been implicated in the transmission of many diseases and thus presents a significant threat to public health. *Clostridium difficile* is a bacterial healthcare associated infection and the leading cause of nosocomial diarrhoea worldwide, with serious implications in that it can result in the isolation of patients, closure of wards and hospitals and even the death of infected individuals. *C. difficile* has recognised potential for environmental persistence due to the development of resistant endospores. These endospores are important sources of infection in the hospital environment. This study sought to determine the role of flying insects as reservoirs and vectors of *C. difficile* spores, which *M. domestica* may transfer due to their synanthropic nature. *M. domestica* exposed to vegetative cell suspensions and spore suspensions of *C. difficile* were able to mechanically transfer the bacteria for up to 4 hours upon subsequent contact with surfaces. The most colony forming units (CFU's) per fly were transferred immediately following exposure (mean CFU's 123.8 +/- 66.9 for vegetative cell suspension and 288.2 +/- 83.2 for spore suspension). After 1 hour this had reduced (21.2 +/- 11.4 for vegetative cell suspension and 19.9 +/- 9 for spores). Mean *C. difficile* CFU's isolated from the *M. domestica* alimentary canal were 35 +/- 6.5; and per faecal spot were 1.04 +/- 0.58. *C. difficile* could be recovered from fly excreta for 96 hours. The significance of these data is that *M. domestica* may indeed harbour *C. difficile* for significant periods of time and transfer low numbers in the healthcare environment, presenting an infection risk to susceptible individuals due to the low infective dose. This study highlights the potential for *M. domestica* to contribute to environmental persistence and spread of *C. difficile* and the need to consider pest control as part of infection control strategies.

Key Words Housefly, disease, bacteria, pest control, infection control, hospital.