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Field evaluation of a semi-automatic funnel trap targeted the medically important non-biting flies

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ABSTRACT

Bait-trapping is a useful approach for monitoring fly population dynamics, and it is an effective tool for physical control of pest species. The aim of this study was to test a newly developed semi-automatic funnel fly trap with some modifications of the former prototype fly trap to study medically important fly population density. The efficacy of the semi-automatic funnel trap was assessed by field sampling during July 2013-June 2014 using 1-day tainted beef offal as bait. The modified semi-automatic funnel traps were able to capture a total of 151,141 adult flies, belonging to the families: Calliphoridae (n = 147,248; 97.4%), Muscidae (n = 3,124; 2.1%) and Sarcophagidae (n = 769; 0.5%), which are the medically important fly species. Among the total of 35 species collected, *Chrysomya megacephala* (Diptera: Calliphoridae) (n = 88,273; 59.95%), *Musca domestica* (Diptera: Muscidae) (n = 1,324; 42.38%) and *Boettcherisca peregrina* (Diptera: Sarcophagidae) (n = 68; 33.01%) were the predominant species of each family. High number of flies was captured in forest area, representing 42.47% (n = 64,197) of total specimens. Female flies were trapped more than male with total sex ratio of 0.37 male/female. Flies were trapped throughout the year with peak population in summer. Peak activity was recorded in the afternoon (12.00–18.00 h). In summary, the modified semi-automatic funnel fly trap can be used for field collection of the adult fly. By setting the timer, population dynamics, diversity, and periodic activity of adult flies were determined.

1. Introduction

Non-biting filth-breeding flies [blow flies (Diptera: Calliphoridae), house fly and their allies (Diptera: Muscidae), and flesh flies (Diptera: Sarcophagidae)] have evolved to live closely associated with humans (synanthropic flies) as nuisance pests (Graczyk et al., 2001). They are medically important flies worldwide playing a major role in spreading enteric pathogens. From a medical point of view, some species have a positive aspect as a forensic tool since larvae collected from human corpses can be used as entomological evidence in forensic investigations, particularly when estimating the minimum postmortem interval (PMI_{min}) (Sukontason et al., 2007; Syamsa et al., 2015). Conversely, in a negative sense, adults are not only mechanical carriers of various pathogens to humans (e.g., bacteria, viruses and parasites), but their larvae also act as myiasis-producing agents (Sacca, 1964; Norris, 1965). Because fly populations increase rapidly due to their relatively short developmental cycles and large egg production in females (Spradbery and Vogt, 1993; Sukontason et al., 2008), control of excessive fly populations is needed to prevent negative impact of these pests.

Several fly control methods [e.g., chemical (insecticides), biological (parasites and predators), and mechanical methods (baited trap and sticky trap) have been reported previously (Thomas and Jespersen, 1994; Hogsette, 1999; Nurita and Abu Hassan, 2010). Daily trapping of insects generates important information on target population dynamics that may help in determining control strategy (Aldridge et al., 2015).Sampling fly populations by hand netting is possible when there

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