



Agriculture and Natural Resources

journal homepage: <http://www.journals.elsevier.com/agriculture-and-natural-resources/>



Short Communication

Potential of attractive toxic sugar baits for controlling *Musca domestica* L., *Drosophila melanogaster* Meigen, and *Megaselia scalaris* Loew adult flies

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ARTICLE INFO

Article history:

Received 27 September 2017

Accepted 27 December 2017

Available online 11 November 2018

Keywords:

Acetamiprid

Attractive toxic sugar bait (ATSB)

Drosophila melanogaster

Megaselia scalaris

Musca domestica

ABSTRACT

Musca domestica, *Drosophila melanogaster* and *Megaselia scalaris* (Diptera: Muscidae, Drosophilidae, and Phoridae, respectively) are common urban pest flies. Potential control of these adult fly species using an attractive toxic sugar bait (ATSB) system was evaluated in the laboratory. ATSB, consisting of a combination of mango fruit syrup (as bait) and acetamiprid (as toxic agent), was evaluated and compared with a commercially available fly bait (EndZone™ Insecticide sticker, FMC Corp., USA) containing acetamiprid. Mango syrup without toxicant (ASB) served as the negative control. The ASB + acetamiprid bait was the most effective control mixture based on initial knockdown within 10 min for house flies and 200 min for phorids. The combination produced a higher percentage of mortality in house flies and phorids, respectively, than in fruit flies; however, there was no significant difference between the bait formulations as indicated by the mean mortality of house flies and phorids. Significant differences in *Drosophila* mean mortality were demonstrated between the ATSB combinations. These findings suggested a fruit-based ASB + acetamiprid system could be used as a cost-effective, alternative for adult fly control.

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Introduction

Musca domestica (L.) (house fly), *Drosophila melanogaster* Meigen (fruit fly), and *Megaselia scalaris* Loew (phorid fly) (Diptera: Muscidae, Drosophilidae, and Phoridae, respectively) are common pest insects globally (Campobasso et al., 2004; Khan et al., 2012; Zhu et al., 2003). *Musca domestica* has been implicated as potential mechanical vectors of pathogens (viruses, bacteria), which may have detrimental health and economic impacts (Greenberg et al., 1970). Male and female flies feed on nectar and organic matter, so they are commonly attracted to waste receptacles and other forms of organic matter (Iqbal et al., 2014). *Drosophila melanogaster* are commonly associated with ripe and spoiled fruits and vegetables, and can have a devastating impact on food production (Markow and O'Grady, 2005). *Megaselia scalaris* is also known as

the scuttle fly and feeds on various damp, decaying organic material, but also functions as a facultative predator (Disney, 2008). Phorid flies are potential mechanical vectors of pathogens and may be responsible for sporadic occurrences of facultative myiasis in humans (Carpenter and Chastain, 1992). In larger numbers, phorids can become serious nuisance pests by infesting various structures, breeding in moist food debris and in drains in food producing or food handling facilities (Disney, 2008).

Many fly species require a sugar source for sustenance and reproduction (Muller et al., 2010). This need for sugar is useful in the deployment of attractive toxic sugar bait (ATSB) systems as a means to control adult flies (Diclaro et al., 2012; Gahan et al., 1954; Hogsette et al., 2002; Yee, 2011). Insecticide resistance in houseflies has been documented with many active ingredients in common chemical classes used for control, including: organochlorines, organophosphates, carbamates and pyrethroids (Khan et al., 2013). Recently, there has been an increased emphasis on the development of new pesticide chemistries or re-purposing older active ingredients with novel applications as a means of combating or

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