

Effect of Semio-chemicals (Methyl Eugenol) on calling behaviour and mating competitiveness of laboratory reared peach fruit fly *Bactrocera zonata*

N.A. PATEL^{1*}, S. FACKNATH^{2*}, P. SOOKAR^{1*}

¹Entomology Division, Agricultural Services, Ministry of Agro Industry & Food Security, Réduit, Mauritius ²Faculty of Agriculture, University of Mauritius, Réduit, Mauritius*Corresponding author E-mail: npatel@govmu.org

INTRODUCTION

Males of a majority of *Bactrocera* spp. are attracted to natural compounds known as semio-chemicals. Ingestion of methyl eugenol from natural sources by males of the *Bactrocera* spp. results in the storage of the compounds and the subsequent release as part of the pheromone during courtship.

That pheromone attraction response mechanism from female fruit flies determine mating competitiveness. Predominant male sexual behavior (calling behaviors) include wing fanning, wing opening, fighting and restlessness and has been reported in several *Bactrocera* spp.



Plate 1: *Bactrocera zonata*



Plate 2: Fruit fly Punctures



Plate 3: Infested Mango

Experiment 1: Effect of Methyl Eugenol on calling behavior (wing fanning) as an indication of sexual maturity

•Methodology

* Flies sexed at emergence; exposed to Methyl eugenol (0.5 ml/100 flies) on day 2 from 08:30 to 09:30 and called 'Me-fed'; control males from the same cohort of flies used as untreated males; observations done between 16:30 to 19:00; 4 groups of 5 males observed in gauze cages for calling behavior until the flies were 30 days old.

Experiment 2: Testing the effect of Methyl Eugenol on Mating Competitiveness of *Bactrocera zonata* in field cages

•Methodology

*50 Me-fed flies and 50 untreated flies released in a field cage at 16:30; thirty minutes later, 50 virgin females released; tests done

in 3 replicates; Mating couples from each cage collected in vials and labelled; time of captures noted over ten minutes from 17:00 to 19:30.

RESULTS

Experiment 1

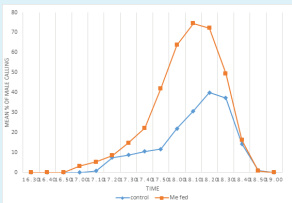


Figure 1: Effect of Time and exposure to methyl eugenol on calling behavior of *B.zonata*

Significantly more calling was observed with ME-fed male flies as compared to untreated males.

Calling behavior was significantly different throughout the time range from 16:30 to 19.00, starting at 17.10 and ending at 18:50.

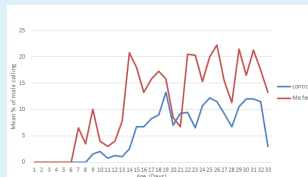


Figure 2: Effect of age and exposure to methyl eugenol on calling behaviour of *B. zonata*

ME-fed male flies started calling earlier on Day 6 as compared to untreated flies which started calling on Day 8. Percentage of flies calling increased significantly with age up to Day 28 then the percentage of calling decreased.

Experiment 2

| Replicates | Treated | Non-treated |
|----------------------|--------------------------------|-------------------------------|
| 1 | 25 | 10 |
| 2 | 32 | 7 |
| 3 | 20 | 8 |
| Mating % (\pm SE) | 25.7 (\pm 3.5) _A | 8.3 (\pm 0.9) _B |

Table 1: Mating competitiveness of treated v/s non-treated flies

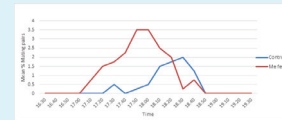


Figure 3: Effect of male exposure to Methyl eugenol on mating competitiveness

Table 1 shows that more than 50 % mating was achieved with the treated males as compared to 16% for the non-treated males. The ME-fed males achieved significantly higher mating success than untreated males (Fig 3). ME fed flies starts mating earlier (17:10) as compared to untreated flies which start mating twenty minutes later.

DISCUSSION & CONCLUSION

Releasing the flies before maturity may cause death of flies either through predation or other causes, before they are able to mate with the wild females. Exposure to ME shows a positive response on calling behavior, as well as on

percentage mating, and an earlier mating schedule.

This implies that the exposed flies have an enhanced mating competitiveness, and Therefore a reduced number of sterile males will need to be released to compete with the wild flies.

An earlier sexual maturity will enable an earlier release of Me-fed flies, thereby reducing the period the flies are kept under lab conditions, and this will definitely contribute in improving the effectiveness of an SIT programme for the suppression of the peach fruit fly.

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