

## DEVELOPMENT OF SUITABLE ADULT DIETS FOR *Anastrepha fraterculus* (DIPTERA:TEPHRITIDAE)

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### Introduction

The South American fruit fly (*A. fraterculus* Wied., 1830) is a major quarantine pest of fruits in Brazil. Many countries have imposed severe restrictions to import fresh fruits from Brazil due to this insect. Attempts to mass rearing *A. fraterculus* have been developed in many fruit producer countries. Among other problems suitable and economic adult diets have been one of the main bottleneck to start and establish a colony. The colony is one of the main pillars of a mass rearing program with focus on Sterile Insect Technique (SIT). It depends totally on insect adjustment for reproduction in artificial diets and control environment. In this paper are shown the results and finds of suitable and economic diets for *A. fraterculus* adults in Brazil.

### Materials and Methods

Since the main goal of this research was to find local source of protein for adult diets, it was tested four diets with the following components:

Diet A - Brewer yeast + white sugar (1:3)

Diet B - Brown sugar (60%) + Hydrolyzed corn protein (26%) + brewer yeast (5%) + bee honey (5%).

Diet C - Hydrolyzed corn protein + white sugar (1:3)

Diet D - Soybean protein + white sugar (1:3).

Pupae of *A. fraterculus* three days before emerging to adults were placed into emergence plastic cages. Group of 100 male and female adults with less than three days old were put in different cages, comprising 5 cages for each of the four diets with a total of 20 cages. After 10 days of adult emergence which has reached sexual maturity, twenty lekking males and twenty lekking females of the same treatment were placed into an acrylic cage for mating. Mating pairs of each treatment were separated in an individual box for behavior studies. The courtship behavior was recorded from 10:00 am to 12:00 pm, average temperature of 27°C and 76% of humidity. Pairs with more than eight minutes of mating were separated and selected for biology studies. Further, ten mated females from each treatment were placed into a small plastic cage (16x10x10cm) with an oviposition silicone panel on fine screen (organza) on front. Each cage was supplied with water and the corresponding adult diet.

The study had four treatments (diets), five replicates (cage with 10 females), comprising 20 cages and a total of two hundred females. After five days, eggs were daily collected from each silicone panel. Eggs were put on moist blotter paper in Petri dishes for egg hatching studies. After ten days of egg laying, females from each treatment were dissected, taken the spermathecae and placed onto a slide, then softly squashed with a cover slip for observation of presence of sperm. Each of the three spermathecae of each female was observed under a light (40X) microscopy and evaluated the number of spermatozoid in each spermathec. The criteria for number of spermatozoid estimation was used a scale of

one to four. Number one (1) stands for zero spermatozoid; number two (2) less than one hundred spermatozoids; number three (3) more than one hundred and less than a thousand; and number four (4) over a thousand spermatozoids.

**Results**

The diet based on brewer yeast presented the lowest performance regarding egg per female per day, egg hatching, mating duration, adult life span and number of sperm per spermathec. The diet B was the best for most parameters (Table 1). Adults fed on diet A had much lower response in searching for females compared to those fed on diets B, C and D. They also present lower mating time. The maximum mating duration was 35 minutes for pairs fed on diet D. The least mating duration time was 6 minutes for pairs fed on diet A.

Table 1 – Biological observations of *Anastrepha zenilidae* adults fed on adult diets

Adult diets	Egg/♀/day	%egg hatching	Mating Duration(min)	Adult life span (day)	Sperm in the spermathecae
A	11 b	29 b	14 c	59 b	<100 (2)
B	23 a	47 a	23 b	75 a	<1000 (3)
C	19 a	43 a	30 a	71 a	<1000 (3)
D	21 a	39 a	31 a	69 a	<1000 (3)

Data followed by the same letter in the same column do not differ significantly according to Tukey's HSD test (P<0.05).

**Conclusions**

- 1) It is clear that type of adult diet has a profound effect on number of sperms in the spermathec.
- 2) Considering that the most important qualities of an adult diet are egg viability and cost, it is concluded that the diet (D) based on soybean protein + white sugar (1:3) can be recommended for a mass rearing program of *A. fraterculus* with a future focus on SIT program.



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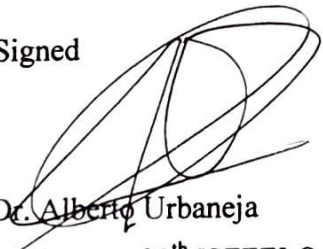
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Signed

  
Dr. Alberto Urbaneja  
Chairman of 8<sup>th</sup> ISFFEI Organizing Committee



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