

Effect of adult diet on nutritional status and fecundity of *Anastrepha fraterculus* (Diptera: Tephritidae) females



Goane, Lucía^{1,2}; Pilar Medina Pereyra³; Felipe Castro³; M. Josefina Ruiz^{1,2}; M. Laura Juárez^{1,2}; Diego F. Segura^{2,4}; M. Teresa Vera^{1,2}

¹Terapéutica Vegetal, Facultad de Agronomía y Zootecnia (UNT), Argentina; ²Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina; ³Instituto de Fisiología Animal, Fundación Miguel Lillo, Argentina; ⁴Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina. lugoane@gmail.com

INTRODUCTION

- Reproductive potential of insect's female depends on their nutritional status and therefore on the diet they ingest.
- Attaining high fecundity levels in females is crucial for mass-rearing and pest management, particularly for SIT.

OBJECTIVE

To evaluate the effect of different artificial diets on the nutritional status and fecundity of *A. fraterculus* females.

MATERIALS AND METHODS

Six diets combining three proteins of different cost, the presence or absence of wheat germ (rich in fatty acids, vitamins and minerals) and sugar were considered.

- **Proteins:** brewer's yeast (CALSA®), yeast extract (BIONIS® YE MF) and hydrolyzed yeast (MP Biomedicals®) combined in 3:1 (sugar:protein) or 3:1:1 (sugar:protein:wheat germen) ratios.
- **Nutritional status:** Protein content was assessed with Bradford's method; lipid, carbohydrate and glycogen content were assessed with Van Handel's method.
- **Fecundity:** mated females were placed in groups of five individuals in plastic containers and provided an oviposition substrate which was replaced every 48 h during twelve days.



RESULTS

Protein source and the presence of wheat germ in adult diet affected the nutritional status and fecundity of *A. fraterculus* females. Higher fecundity was recorded in females fed with MP and BIONIS protein sources. Lipid content showed the same pattern as fecundity.

Figure: Female fecundity of *A. fraterculus* fed diets with different protein sources, with (WG) or without (NWG) wheat germen. MLM, $p < 0.05$.

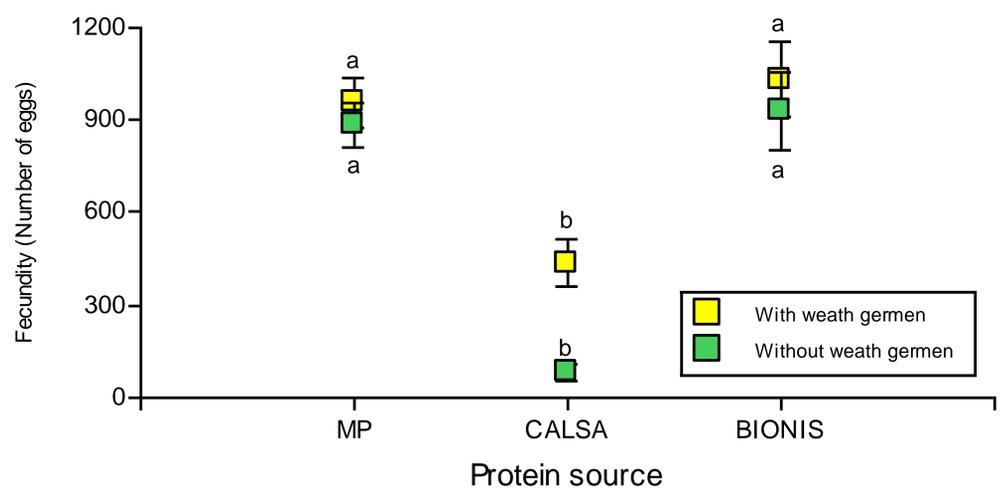


Table: Average nutrient content per fly ($\mu\text{g}/\text{mg}$) of *A. fraterculus* females fed a diet with different protein sources with (WG) or without (NWG) wheat germen.

NUTRIENTS		PROTEINS	LIPIDS	CARBOHYDRATE	GLYCOGEN
MP Biomedicals®	WG	43.2 ± 2.8 b	73.8 ± 2.9 a	119.9 ± 6.6 c	45.5 ± 1.4 c
	NWG	35.7 ± 3.4 b	73.8 ± 4.3 a	161.4 ± 11.5 a	52.2 ± 1.9 bc
CALSA®	WG	65.3 ± 2.9 a	60.9 ± 3.3 ab	157.6 ± 8.5 ab	54.5 ± 2.5 ab
	NWG	63.5 ± 3.8 a	57.4 ± 2.1 b	149.9 ± 10.2 abc	63.1 ± 3.8 a
BIONIS® YE MF	WG	59.0 ± 2.2 a	72.7 ± 2.7 a	123.0 ± 7.4 bc	47.4 ± 1.6 bc
	NWG	34.3 ± 2.6 b	66.2 ± 3.0 ab	116.7 ± 7.2 c	51.2 ± 1.7 bc

Means followed with the same letter in the column did not differ significantly (MLM, $p < 0.05$).

CONCLUSIONS

- This information allows progress in the development of mass rearing protocols for *A. fraterculus*.
- MP and BIONIS seems to provide the nutrients required to attain high fecundity levels.
- Adult diet should consider not only protein content but also adequate lipid combinations necessary to vitellogenesis.
- Further studies are needed to evaluate reducing ratios of MP protein without compromising these fecundity levels.
- We also propose to analyze whether increased concentrations of wheat germ or protein in Calsa diet (an inexpensive protein source) increases female fecundity to values comparable with those obtained with MP and Bionis proteins.

