SEXUAL COMPATIBILITY AMONG *Anastrepha fraterculus* WILD POPULATIONS FROM BRAZIL

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INTRODUCTION

Mechanisms of reproductive isolation pre- and post-zygotic have been demonstrated in populations of *Anastrepha fraterculus* from South America (Vera et al., 2006; Cáceres et al., 2009). Studies showed population differences in morphology, isozymes, karyotypes, morphometry, and egg morphology (Stone 1942, Morgante et al., 1980, Steck 1991, Selivon et al., 1998; 2005; Hernández-Ortiz et al., 2004; 2012), leading to the consideration that it may be a complex of cryptic species. In Brazil, there are at least three species within the complex: *A.* sp.1 *aff. fraterculus, A.* sp.2 *aff. fraterculus*, and *A.* sp.3 *aff. fraterculus* (Selivon & Perondini 1998; Selivon et al. 2004, 2005). However, little is known about the sexual compatibility among different populations of this complex in Brazil. Studies to clarify their status are important for SIT application and understanding of speciation processes in the complex. In this study the sexual compatibility of populations from southern and southeastern Brazil was evaluated.





MATERIALS AND METHODS

SOURCE OF FLIES

SITE	GEOGRAFIC COORDINATES	HOST	ALTITUDE (m)
Bento Gonçalves - RS	29° 10' 15" S 51° 31' 08" W	*eijoa sellowiana* and *Pisidium cattleianun*	7
Pelotas - RS	31° 46' 19" S 52° 20' 34" W	*P. cattleianum*	750
São Joaquim - SC	28° 17' 38" S 49° 55' 55" W	*Campomanesia xanthocarpa*	1360
Piracicaba - SP	22° 43' 30" S 47° 38' 56" W	*P. guajava*	547

COMPATIBILITY TESTS

Sexual compatibility tests, involving pairwise comparisons among populations from two different origins, were carried out in field cages (3 x 2m) containing a tree of *Ficus benjamina*. 25 marked pairs of each population with 10 to 20 days of age were released into the cage early in the morning (7 A.M.) and observed until 11 A.M. Sexual compatibility was analyzed through ISI index (Index of Sexual Isolation), and mating propensity of males and females were evaluated through MRPI (Male Relative Performance Index) and FRPI (Female Relative Performance Index). Departure from random mating were assessed by estimating confidence intervals at 95% to see if zero was included in the interval (Rull et al., 2012).



$$ISI = \frac{(SS+WW)-(SW+WS)}{SS+WW+SW+WS} \qquad FRPI = \frac{(SS+WS)-(SW+WW)}{SS+SW+WS+WW} \qquad MRPI = \frac{(SS+SW)-(WS+WW)}{SS+SW+WS+WW}$$

COMBINATIONS TESTED

PELOTAS *vs.* BENTO GONÇALVES

SÃO JOAQUIM *vs.* BENTO GONÇALVES

PIRACICABA *vs.* BENTO GONÇALVES

PIRACICABA *vs.* SÃO JOAQUIM

RESULTS

Combination tested	PM *	ISI (95% CI)	MRPI (95% CI)	FRPI (95% CI)	# replicates
Pelotas - Bento Gonçalves	56.3 ± 9.6	0.14 ± 0.07 (-0.04 to 0.32)	0.05 ± 0.06 (-0.12 to 0.23)	0.06 ± 0.07 (-0.12 to 0.24)	6
Bento Gonçalves - São Joaquim	70.0 ± 4,4	0.14 ± 0.07 (-0.05 to 0.33)	0.04 ± 0.05 (-0.10 to 0.20)	0.07 ± 0.08 (-0.17 to 0.32)	5
Piracicaba - Bento Gonçalves	68.3 ± 4.2	0.56 ± 0.05 (0.41 to 0.71)	-0.12 ± 0.03 (-0.21 to -0.04)	-0.08 ± 0.08 (-0.29 to 0.12)	6
Piracicaba - São Joaquim	55.6 ± 3.6	0.55 ± 0.09 (0.31 to 0.78)	-0.45 ± 0.09 (-0.69 to -0.20)	-0.31 ± 0.07 (-0.51 to -0.10)	6

* PM = Percentage of mating

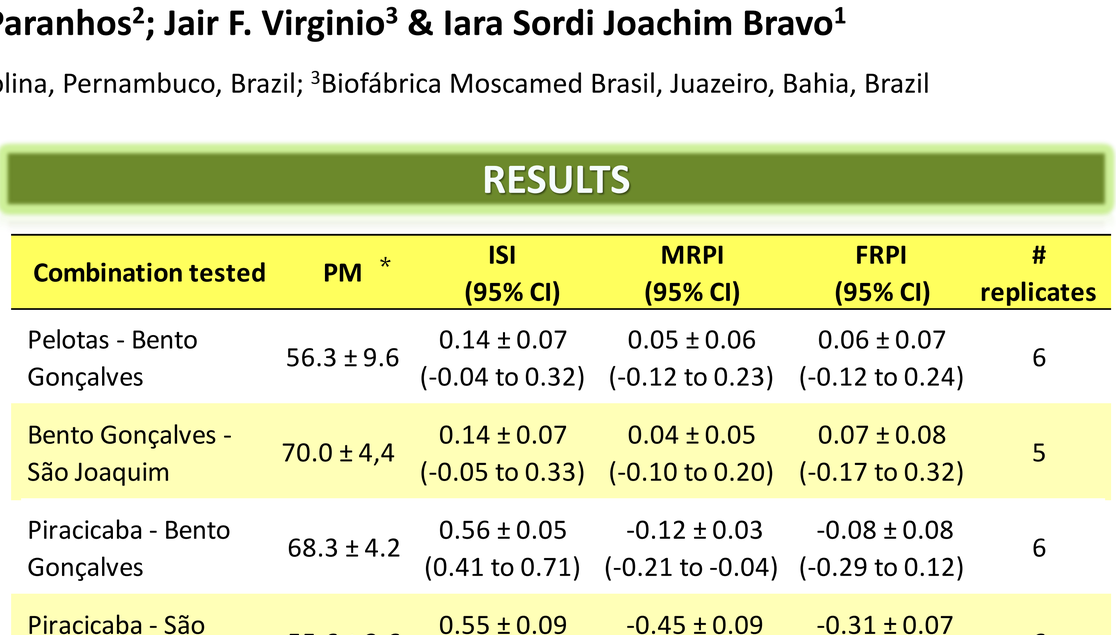

Fig. 1: Mean (± SD) number of couples for different mating combinations among the different *A. fraterculus* population*:* (1) Pelotas (PEL) *vs.* Bento Gonçalves (BEN) ($F_{3,23}$=0.524, p=0.671); (2) São Joaquim *vs.* Bento Gonçalves ($F_{3,19}$=1.74, p=0.197); (3) Piracicaba *vs.* Bento Gonçalves ($F_{3,23}$=28.43, p< 0.0001); (4) Piracicaba (PIRA) *vs.* São Joaquim ($F_{3,23}$=33.23, p<0.0001). Columns with different letters are statistically different at the 0.05 level (one-way ANOVA followed by Tukey-Kramer comparison of means).

CONCLUSION

The preliminary results suggest that *A. fraterculus* populations from southern and southeastern Brazil may not belong to the same biological entity.

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