

Fruit flies adults monitoring in lemon orchards

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INTRODUCTION

The fluctuation in the population abundance of fruit fly is intimately connected with the climatic conditions and with the diversity, phenology, abundance and degree of preference of the host (Aluja, 1984). All these factors will determine the movement of the flies in their search for food, water, shelter and breeding places.

The development of the fly and the harm caused to a certain fruit and/or host will depend on the susceptibility of the host (Morgante, 1991) and on the climatic factors mentioned above.

Although the use of traps and trapping systems are useful to analyze the dynamics and the population abundance of fruit flies, the capture of adults from a trap placed in a certain crop does not necessarily imply a preference for that species or that it should be considered as a host (Putruele 1996). There are no records concerning the study of the population dynamics of fruit flies in lemon (*Citrus limon* (L.) Burm. f.) commercial crops.

The aim of the present work was to study the population fluctuation in *Ceratitis capitata* (Wiedermann) and *Anastrepha fraterculus* (Wiedermann) in the lemon growing area of the province of Tucumán.

MATERIALS AND METHODS a) Localities

The monitoring of adult flies was carried out in four localities representative of the lemon growing area of the province of Tucumán: El Rodeo, Burruyacu department (northeast); Los Nogales, Tafí Viejo department (northwest); Famaillá, Famaillá department (centre) and Monte Bello, Río Chico department (south) (Fig. 1). In each locality a lemon orchard was chosen.

b) Monitoring methodology

For the monitoring of adult fruit flies, in each of the four lemon growing farm lands 10 Jackson traps (1 per ha) were placed, with sexual baits for *C. capitata* (Fig. 2) and 10 Mc Phail traps (1 per ha) with food baits for *C. capitata* and *A. fraterculus* (Fig. 3). Monitoring was effected every week throughout the year.

The data obtained were recorded on tables in order to calculate the number of flies per trap per day (FTD) for *C. capitata* and

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Figure 1. Monitoring sites in the citrus growing area in Tucumán.



Figure 2. Mc Phail trap in lemon tree.



Figura 3. Jackson trap in lemon tree.

A. fraterculus in each of the four localities.

FTD were calculated every year for the export period (April - September), autumn and winter in the southern hemisphere, and for the non export period (October - March), spring and summer in the southern hemisphere.

RESULTS

The results of the monitoring of adults of both fly species were analyzed for each year.

A) Year 2004

FTD was calculated for the export period (May - September) and non export period (October - December).

Figures 4 and 5 show the weekly fluctuations in FTD for *C. capitata* in Jackson and Mc Phail traps, respectively, and in Fig. 6 for *A. fraterculus*.

During the export period very low population levels were registered with a maximum FTD of 0.03 for Famaillá, while in two localities no



Figure 4. Fluctuation in the FTD index for C. capitata with Jackson traps during the year 2004.



Figure 5. Fluctuation in the FTD index for C. capitata with Mc Phail traps during the year 2004.



Figure 6. Fluctuation in the FTD index for A. fraterculus with Mc Phail traps during the year 2004.

captures of *C. capitata* were registered (Fig. 4). Maximum FTD for *A. fraterculus* was 0.10 in El Rodeo (Fig. 6). while in El Rodeo no *C. capitata* captures were made (Fig. 4). There were no captures of *A. fraterculus* in any of the four localities (Fig. 6). **B) Year 2005**

During the non export period, maximum FTD obtained was 1.27 in the Famaillá locality,

Figures 7 and 8 show the fluctuation in the

weekly FTD for *C. capitata* in Jackson and Mc Phail traps, respectively, and in Fig. 9 for *A. fraterculus*.

During the export period values lower that 0.07 were obtained for *C. capitata* in three localities while in the fourth locality (Monte

Bello) maximum FTDs were registered, with values of 0.25 for *C. capitata* (Fig. 7) and 0.14 for *A. fraterculus* (Fig. 9).

During the non export period (January -March and October - December), FTD was high in summer, with a peak of 2.35 in



Figure 7. Fluctuation in the FTD index for C. capitata with Jackson traps during the year 2005.



Figure 8. Fluctuation in the FTD index for *C. capitata* with Mc Phail traps during the year 2005.

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Figure 9. Fluctuation in the FTD index for A. fraterculus with Mc Phail traps during the year 2005.

Monte Bello for C. capitata (Fig. 7). Maximum FTD for A. fraterculus was 0.11 in Los Nogales (Fig. 9).

the weekly FTD for C. capitata in Jackson and Mc Phail traps, respectively and Figure 12 for A. fraterculus.

C) Year 2006

During the export period, no captures Figures 10 and 11 show the fluctuations in were made in El Rodeo, while in Monte Bello









Figure 11. Fluctuation in the FTD index for C. capitata with Mc Phail traps during the year 2006.



Figure 12. Fluctuation in the FTD index for A. fraterculus with Mc Phail traps during the year 2006.

a maximum FTD of 0.84 was reached for C. capitata (Fig. 10) and 0.06 for A. fraterculus (Fig. 12).

March and October - December), maximum FTDs were obtained in Monte Bello, with values of 2.58 for C. capitata (Fig. 10) and During the non export period (January - 0.31 for A. fraterculus (Fig. 12).

D) Year 2007

FTDs were calculated for the export periods (April - September) and the non export period (January - March).

Figures 13 and 14 show the fluctuations in weekly FTD for *C. capitata* in Jackson and Mc Phail traps, respectively and Figure 15 for *A. fraterculus*.

During the export period, no captures were

made in three localities, while in the fourth (Monte Bello), maximum FTD was 0.10 for *C. capitata* (Fig.13). Maximum FTD for *A. fraterculus* was 0.08 in Los Nogales (Fig. 15).

During the non export period, maximum FTD of 1.91 was reached in Monte Bello for *C. capitata* (Fig. 13) and of 0.31 for *A. fraterculus*. (Fig. 15).

Tables 1 and 2 show as a summary the



Figure 13. Fluctuation in the FTD index for *C. capitata* with Jackson traps during the year 2007.



Figure 14. Fluctuation in the FTD index for C. capitata with Mc Phall traps during the year 2007.

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Figure 15. Fluctuation in the FTD index for A. fraterculus with Mc Phail traps during the year 2007.

YEAR	LOCALITIES			
	El Rodeo	Los Nogales	Famaillá	Monte Bello
2004	0.01	0.00	0.03	0.00
2005	0.07	0.05	0.01	0.25
2006	0.00	0.04	0.01	0.84
2007	0.00	0.00	0.00	0.10

Table 1. Maximum FTD found during the 2004 - 2007 export period for C. capitata.

Table 2. Maximum FTD found during the 2004 - 2007 export period for A. fraterculus.

YEAR	LOCALITIES			
	El Rodeo	Los Nogales	Famaillá	Monte Bello
2004	0.10	0.02	0.02	0.02
2005	0.11	0.10	0.04	0.14
2006	0.01	0.04	0.02	0.06
2007	0.07	0.08	0.01	0.00

maximum FTD values found for *C. capitata* the 2004 - 2007 export periods (fall - and *A. fraterculus*, respectively, during winter).

CONCLUSIONS

On the basis of the results obtained from the monitoring of adult fruit flies, we may conclude that:

1.- Adult *C. capitata* populations in lemon farm lands are low during the export period (fall - winter).

2.- Adult *A. fraterculus* populations in lemon farm lands are low during the export period (fall - winter).

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Fruit flies and its quarantine relevance in the citriculture of Northwestern Argentina. Eleven years of research 1996-2007