

PRESENT SITUATION OF SOUTH AMERICAN CUCURBIT FRUIT FLY *Anastrepha grandis* (Macquart, 1846) AND OTHER SPECIES OF ANASTREPHA (DIPTERA: TEPHRITIDAE) AT THE DEPARTMENT OF CONCEPCIÓN.

1. ABSTRACT

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The objective of this work was to implement the actions of phytosanitary surveillance, based on the ISPMs N° 6 and 8 for South American Cucurbit Fruit Fly *Anastrepha grandis* (Macquart, 1846) to determinate the situation of the pest on the area described in the “Protocol for exportation of *Cucurbita moschata* (Calabacita) under “Approach Systems” signed with the Republic of Argentina and determinate the dynamic population of others species of the genus *Anastrepha* in the Department of Concepción (Districts: Loreto, Belén, Horqueta y Concepción). Was selected plot of lands cultivated with cucurbitaceas, in different phenologic stages, in which was installed traps of the type Mac Phail with food attractants of the type “Torula” (hydrolyzed protein), which was reviewed with a weekly frequency. Besides, were installed traps in alternative innkeepers (guava, citrus, mango, etc) of *A. grandis*. It was considered priority the monitoring in those areas directly compromised with the yield of Cucurbitaceas (plots in production). The work’s duration was 8 weeks, from January to February of present year. The revision of the traps was carried out with a frequency of between 6 to 10 days. The specimens’ captured were identified in the Biological Laboratory of SENAVE on the base to Protocol 01 (fruits fly), method in processing of accreditation with the ISO 17025. Was carried out sampling of fruits on field, with the objective of detecting immature stages of the pest. The results indicated it was not detected adult and immature stages of *A. grandis* in all the work period. Besides, it had captured and had identified 2.535 (two thousand five hundred and thirty five) specimens of the genus *Anastrepha* of various species, in 29 (twenty nine) traps installed, of which 98,7% belongs to *A. fraterculus*; 0.16% to *A. obliqua*; 0,12% to *A. montei*; 0,75% to *A. bistrigata*; 0,04% to *A. serpentina*; 0,08% to *A. manihotis*; 0,04% to *A. pickelii* y 0,08% to *A. daciformis*. Of the generated information’s, was elaborated MTD (rate of Trap’s Capture) for *Anastrepha grandis* and other, for the rest of species of *Anastrepha*.

KEY WORDS: SENAVE, Surveillance, Calabacita, Absence, Presence

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2. INTRODUCTION

The Phitosanitary Vigilance Department, with the Agriculture Defense Division, under the coordination of the Direction of Plant Protection as part of the Program of Phitosanitary Protection in Cucurbitaceas in the Department of Concepción, have taken actions in order to establish the presence or absence of the *Anastrepha grandis* (South American Cucurbit Fruit Fly) and to know the situation and the dynamic population of other species of genre *Anastrepha* from the districts of Belén, Loreto, Concepción and Horqueta.

The work has been carried out during eight weeks (from January to February /2006), in order to establish the present situation of the South American Cucurbit Fruit Fly (*Anastrepha grandis*) in the mentioned districts as a previous job for the implementation of the “Exportation Protocole” of *Cucurbita moschata* (Calabacita) signed with SENASA from the Republic of Argentina and the SENAVE from the Republic of Paraguay.

This work gives a summary of a job of eight weeks emphasizing that the majority of the traps were installed in parcels of cucurbitaceas in different phenologic periods, in agricultural areas of four districts, and other traps had been installed in fruit trees which are host of other species of the genre *Anastrepha*, but could also be an alternative place for the *Anastrepha grandis* (Marín Patiño 2001; Scaloppi junior, 2004).

It is possible to stand out that during the development of this work have not identified a single specimen of *Anastrepha grandis* between the collected insects, either in immature states (larvas) in the samplings of fruits made at field in the different parcels, where the traps have been installed.

The developed actions in the mentioned Department are based on the (ISPM N° 6); (ISPM N° 8) of the IPPC.

3. METHODS

The work was carried out during eight weeks, from January to February/2006 and was developed in four main phases:

- a. **Location and Characterization of the area:** The work area included four districts at the Department of Concepción (Loreto, Belén, Horqueta, and Concepción)
- b. **Selection of the mechanism of detection:** The parcels selection cultivated with cucurbitaceas were done in different zones from these districts. In each selected parcel was installed one trap type Mc Phail which attractant food (Hydrolyzed Protein) which was weekly inspected. In addition, other traps were installed in fruit trees (guava, citrus, mango, fruit passion, etc) in order to determine the presence and the population dynamic of other species of the genus *Anastrepha*.

The collected samples were sent to the Biological Laboratory of SENAVE for its identification.

- c. **Analysis of samples in the Biological Laboratory of SENAVE:** Reception of samples, Process of samples, identification under the PROTOCOLE 01 (Flies of the Fruit) and remission of Results.
- d. **Processing of the obtained data:** Database, rate of fly trap day (MTD) of *A grandis*, rate fly trap day (MTD) of other species of *Anastrepha*

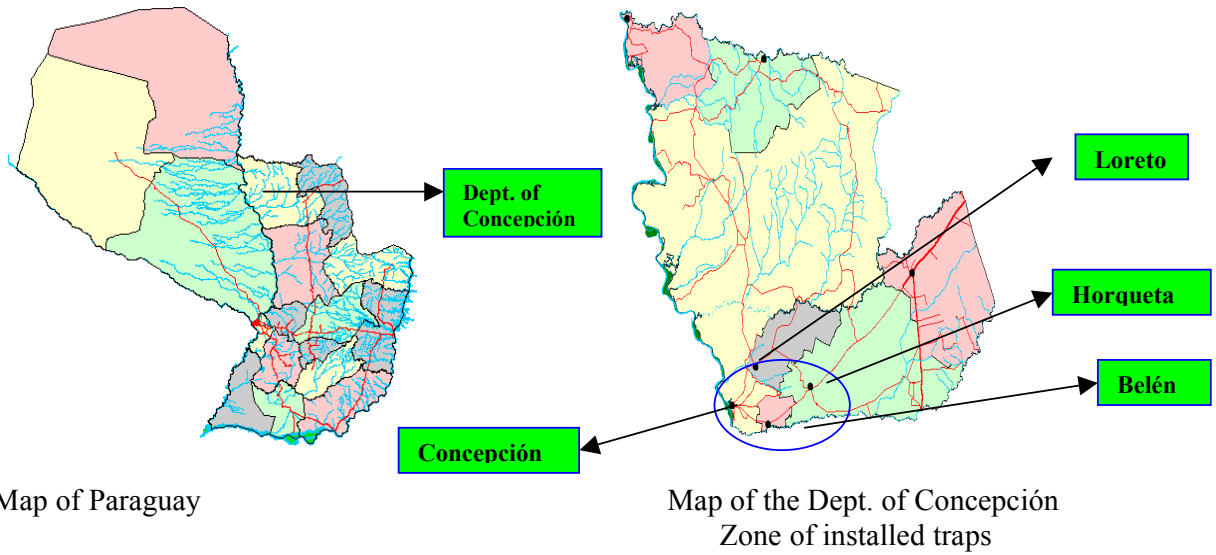
In order to establish the rate MTD, it was employed the following formula:

$$MTD = \frac{M}{T \times D}$$

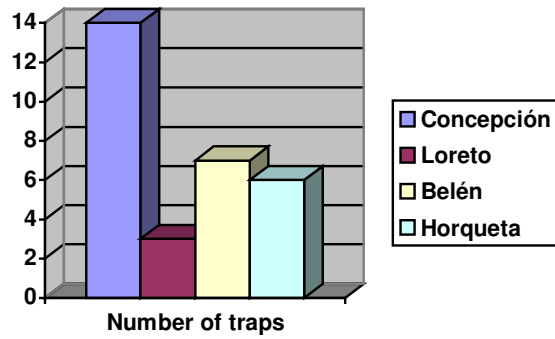
- Being M = N° total of flies
T = N° of inspected traps
D = N° (average) of traps exposed at field

Following is shown the number of traps Mc Phail installed for work zones.

Graphic N° 1. Location of the area of work at the Department of Concepción



Graphic N° 2. Zones of installed traps and number installed at the Dept. of Concepción for Work Zone-Asunción, April 2006



District	Number of Traps
Concepción	14
Loreto	3
Belén	7
Horqueta	6

4. RESULTS AND DISCUSSION

Gradually, as the cultivated parcels with cucurbitaceas were identified, traps of the type Mc Phail were installed, with a total number of 30 (thirty) traps.

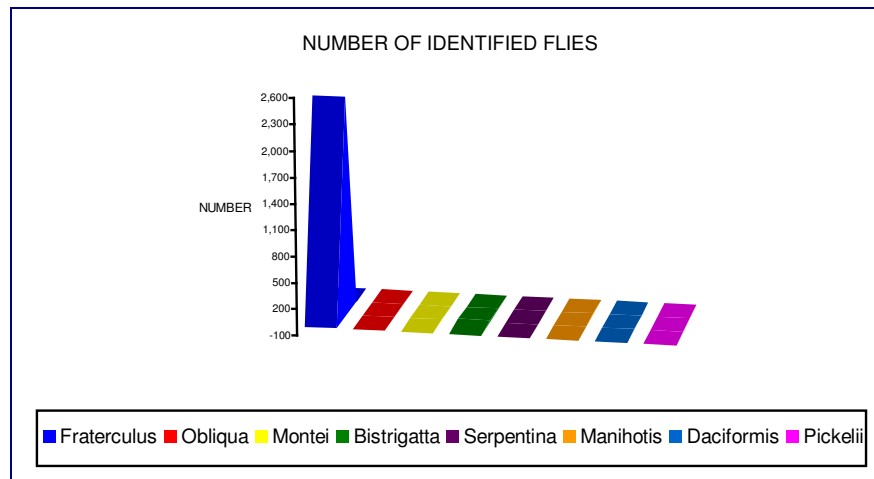
The revision of the traps was made with a frequency of between 6 to 10 days. During the sampling of fruits to field, it was not detected immature states of the plague (egg, larva) of *A. grandis*

It has been captured 3,433 Fly specimens of the genre *Anastrepha* and 2,535 (two thousand five hundred and thirty five) *Anastrepha* specimens of several species have been identified, of a total of 30 (thirty) installed traps, in 8 (eight) weeks of work, which represents 73.84% of the total.

With the total identified specimens (2,535), 98.7% corresponds to *Anastrepha fraterculus* and the last 1.3% corresponds to the other species which composition can be observed in Graphic N° 3, as it is shown following.

The 26.16% of the captured specimens could not be identified, due to faults in the material preservation (excessive temperature and inadequate mix of alcohol with water) during the transport from the capture zone (Department of Concepción) to the SENAVE Laboratory placed at the city of San Lorenzo.

Graphic N° 3 Captured Species of the genre *Anastrepha* in the months January- February/2006, at the Dept. of Concepción – Asunción-April, 2006



From the results generated, MTDs (rate of capture of traps) has been elaborated, one for *Anastrepha grandis* and another for the other species of *Anastrepha* which has been captured in traps. In addition, graphics and tables are shown based on the obtained data.

The higher percentage of capture of *A. Fraterculus* in traps was due to cultivations such as Guava (*Psidium guayaba*), Mango (*Mangifera indica*), Sweet orange (*Citrus sinensis*), Grapefruit (*Citrus paradinsis*) which were in the period of maturity in the different zones of work, between December and March.

Moreover, other species which have been captured in the mentioned traps are: *Anastrepha oblicua*, *serpentina*, *bistrigata*, *daciformis*, *montei*, *manihotis* y *pickelii*.

All of the species previously mentioned have a large range of hosts from diverse families and species, according to the bibliography mentioned.

Only one specimen of the genre *Anastrepha* was captured in traps installed in Cucurbitacea, which belongs to the *montei* species, that represents 0.029 % of the captured specimens.

In the next table, it can be observed the number of specimens of *Anastrepha* spp. captured according to species, sex and month.

Table N° 1. Total of identified specimens of the genre *Anastrepha* in the months of January-February/2006 at the Dept. of Concepción – species and sex – Asunción - April, 2006.

IDENTIFIED SPECIES	JANUARY		FEBRUARY		TOTAL
	Male	Female	Male	Female	
<i>Anastrepha fraterculus</i>	205	194	1.196	908	2.503
<i>Anastrepha oblicua</i>	0	0	2	2	4
<i>Anastrepha montei</i>	0	1	1	1	3
<i>Anastrepha bistrigata</i>	2	0	10	7	19
<i>Anastrepha serpentina</i>	0	0	1	0	1
<i>Anastrepha manihotis</i>	0	0	0	2	2
<i>Anastrepha daciformis</i>	1	0	0	1	2
<i>Anastrepha pikelli</i>	0	1	0	0	1
TOTAL	208	196	1.210	921	2.535

In the table can be observed the number of specimens of *Anastrepha* captured in February/2006, it is five times superior at the number captured in January. This is a result of the gradually rising of the installed traps according to the disponibility of parcels of Cucurbitaceas in the zone.

At the same time of trap installation in cultivations of Cucurbitaceas, were also installed in other host such as guava, mango and citruses.

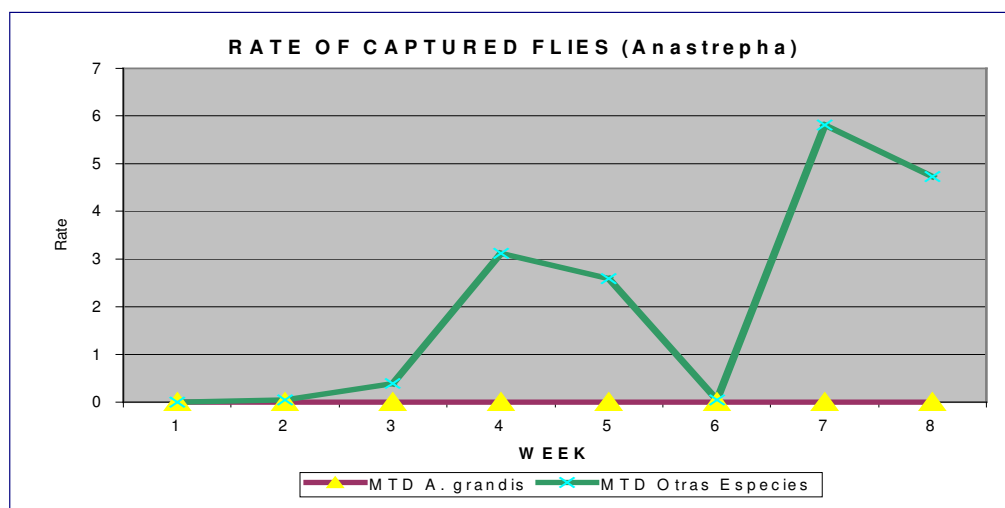
In relation to the MTD for trap corresponding to studied period of time for *Anastrepha grandis* is 0.000; while for the other species of *Anastrepha* varies from 0.043 to 5.813 corresponding the highest point of capture in the third week of February, due to the higher disponibility of food in that period, such ideal climate conditions for the

development of the plague. However, the highest point decreased slightly in the last week of February, as it is shown in Graphic N° 4.

In the second week of February the MTD was 0.049 due to the loss of the material for capture because of deficient conservation as it was explained previously.

This situation can be observed in Graphic N° 4 which is shown as follows.

Graphic N° 4. Rate MTD of genre *Anastrepha* in the months of January-February/2006, at the Dept. of Concepción – Asunción - April, 2006.



In reference of the average of climate data during the months of January and February of this year, it is showed in the following table.

Table N° 2. Climate data from January to February at the Department of Concepción - Asunción, April 2006.

CLIMATE DATA		VALUES		AVERAGE
Details		JANUARY	FEBRUARY	
Air temperature	Máxima °C	36,8	36,9	36,9
	Mínima °C	17,6	23,5	20,6
	Media Mensual °C	27,2	31,5	29,4
Soil temperature				
At 10 cm of depth	Máximum °C	35,6	36,7	36,2
	Mínimum °C	29,5	29,7	29,6
	Month Media °C	32,6	33,2	32,9
At 5 cm of depth	Máximum °C	40,1	41,8	41,0
	Mínimum °C	27,6	28,1	27,9
	Month Media °C	33,9	34,9	34,4
At 0 cm of depth	Máximum °C	50,7	54,6	52,7
	Mínimum °C	26,3	26,1	26,2
	Month Media °C	38,5	40,4	39,5
Relative humidity	Máximum %	86,7	86,1	86,4
	Mínimum %	55,2	47,1	51,2
	Month Media %	70,9	66,4	68,7
Pluvial Precipitacion	mm	30	32,1	31,05

From: Estación Agrometeorologica Escuela Agrícola Concepción, 2006.

It can be inferred from the climate data that the probability to capture *A. grandis* specimens in the zones under this study is low, taking into account that the extreme temperature of the region is up of the average range of the biologic temperature of the insect.

5. CONCLUSIONS

- During the monitoring time (trapping and sampling), any specimen of *A. grandis* in traps has been captured and it has not been detected in immature states in fruits.
- Considering the obtained results regarding the Fly Trap Day (MTD) for *A. grandis*, we can say that the temperature and humidity conditions are not appropriate for the establishment and survival of the plague in this period of the year and for the short time of the study, it can not be predicted the presence or absence of the plague in the monitored region.

6. REFERENCES

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