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# Longevity and parasitic capacity of the azorean type of *Trichogramma cordubensis* Vargas & Cabello *(Hym., Trichogrammatidae)*

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## Summary

The recent capture at the island of Sao Miguel-Azores of a local type of *Trichogramma cordubensis* **Vargas & Cabello** (Hym., Trichogrammatidae) gave rise to the question of its epigenetic characterization, according to parameters indentical to those of the continental type. This characterization was carried out with the objective of recognizing its ability to be used as a bioligcal control agent against agricultural pests in this region.

It was verified, for this local type, that, in similarity with the continental type, the maximum of its parasitic capacity occurs in the first day after emergence. This seems to indicate that this insect should be introduced in the inundative release fields before its emergence.

The local type of *T.cordubensis* diverged significantly from the continental type in its longevity.

## Material and methods

The first capture of the local *T.cordubensis* type was made by **Pintureau** *et al* (1990), in June 1989, at the location of Remédios, Lagoa. Later on, individuals were obtained at other places, namely Feteira-Livramento and Rabo de Peixe, from parasitized eggs of *Heliothis* spp. (Lep., Noctuidae). For its laboratory maintenance, eggs of the factitious host *Ephestia kuehniella* **Zeller** (Lep., Pyralidae) were used according to the technique described by **Tavares** (1989). For this study, 40 females (less than 12 hours old), obtained at random from a population of over 2000 individuals, were isolated in glass test tubes (5x1cm). For each female, a cardboard (2x0.5cm), containing nearly 250 UV-radiated *E.kuehniella* eggs, was provided daily. A small drop of honey was provided for food. The cardboards were put in individual test tubes away from contact of other females. All the females and cardboards were maintained in tubes with the same characteristics and in the same environmental conditions. The cardboards were all marked according to the female number and date of parasitism. Six days after this date, the parasitized eggs, indentified by their dark color, were counted. Eleven days after parasitism, the first emergences of *T.cordubensis* adults occured. The dates of death of all females were noted for the calculation of longevity. The counting of parasitized eggs was used to estimate the parasitic capacity of this species, both on a total and a daily basis.

## Results and discussion

*Longevity*. The average lifetime obtained was 9.1 days (range : 4-16) with a s.d. of 3.5 days. The death of the females with lower lifetime (4 days) was considered to be premature and was probably caused by falling in the honey drop. Even so, the average lifetime was still highly above the value reported by **Cabello & Vargas** (1986) for the continental type :

4 days (range : 1-9). This difference probably indicates a better adaptation of the local type to the experimental conditions. The maximum indicated by these authors was lower than the one obtained for the local type and acomplished in conditions of cyclic temperature oscillating between 15°C and 25°C.

From the frequency distribution of longevity (Fig.1), it can be verified that the modal group is the 6-8 days group and that more than 50% of the females stand between 6 and 11 days of lifetime. The analysis of this frequency histogram shows that a tendency for lower lifetime periods has to be noted if we have in consideration that the modal group stands to the left of the average lifetime period.

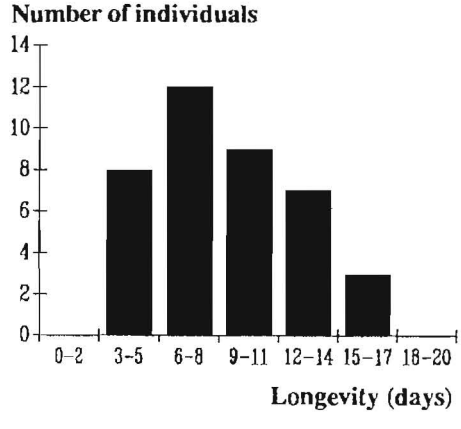


*Figure 1 : Frequency distribution of longevity for the T.cordubensis females.*

*Parasitic capacity.* Fig.2 shows a graphic representation of the daily averages of *E.kuehniella* eggs parasitzed by *T.cordubensis* females during 16 days. The average value for the total parasitism of *T.cordubensis* was 49.4 eggs (range : 15-93). This great variation between extremes can possibly be explained by the variation found between the extremes of longevity (4 and 16 days).

The average value for the total parasitic capacity for the continental population (**Cabello & Vargas**, 1986) is only 80% of the one founded for the azorean type. A possible explanation for this could be, not a difference in the parasitic capacity itself, but related to the difference in the longevity value found between the females of the two types. The local type females, having a longer longevity, have indeed more time to parasitize the host eggs, thus leading to higher parasitic levels although no direct proportions were found between the differences in longevity and in parasitic capacity.

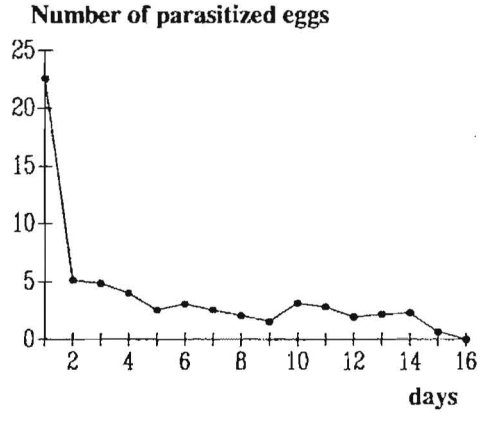


*Figure 2 : Average daily parasitism of E.kuehniella eggs by T.cordubensis females.*

To investigate the similarity levels between the total parasitism of the individuals of higher and lower longevity, a Wilcoxon-Mann Whitney test (U-test) was done between the groups of individuals with lifetimes between 4 and 7 days and 13 and 16 days, respectively. A value of U=3, inferior to the critical value of U=9 for a probability of error of 0.1% was obtained. This result leads to the rejection of the hypothesis of equality between the parasitic capabilities for the two groups as it would be expected by an empiric observation of the results. This verification leads to the same earlier conclusion for the different parasitic capacity averages between the two types of *T.cordubensis*.

Finally, concerning the study of parasitic capacity of the local type *T.cordubensis* females, two other parameters must be considered :

the average daily percentage of the total parasitic capacity and its cumulative value. Fort the first one, a value of 46% was obtained on the first day, falling to 10% on the second day and progressively descending to 0% on the 15th day. For the second parameter, near 90% of the total parasitic capacity was attained at the end of the 7th day. Eight additional days are necessary to complete the remaining 10%. These results are in accordance with those obtained by other authors for other *Trichogramma* species (**Ram & Sharma**, 1977 ; **Pintureau** *et al*, 1981 ; **Tavares**, 1985).

## Conclusion

We conclude that the local type of *T.cordubensis* differs significantly from the continental type according to its higher longevity. The parasitic capacity shows also some differences between the two types. These last differences should not be attributed to the parasitic capacity itself, but must be related to the differences in longevity between the two types.

For the local type we verified that, similar to the continental type and other *Trichogramma* species, the highest level of parasitic capacity occurs during the first day after emergence. These facts indicate this time to be the best one for eventual inundative releases of this species as a biocontrol agent.

The good level of parasitic capacity found, associated with the inexistence of a tendancy for superparasitism (**Pinto & Tavares**, 1990) and a probaly better adaptation to the local environmental conditions (in comparison to other *Trichogramma* species) are qualities that leads us to continue studies for a possible use of this type of *T.cordubensis* in the biological control of pests in the Azores.

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