BIOLOGY OF TRIATOMINAE (REDUVIIDAE, HEMIPTERA) FROM NORTH OF FORMOSA COUNTY (GOIÁS – BRAZIL). I. LENGTH OF LIFE CYCLE OF TRIATOMA SORDIDA (STAL. 1859).

Dalva A. Mello*

In the present paper the life cycle of Triatoma sordida *was studied. The mean length from egg to adult was 213 days. The mean length in days from each stage was: 24.3 (± 1.30) for the first. 32.8 (± 1.45) (2nd), 36.1 (± 1.50) (3rd), 44.6 (± 1.85) (4th) and 52.0 (± 1.92) (5th).*

The mean egg incubation period was 23.2 (± 1.40). Overall mortality was 18.8% and egg viability was 82.5%.

INTRODUCTION

Triatoma sordida is a reduviid extensively distributed throughout the South American continent[4]. It is found in domestic as well as in wild environments. In the first case, it is usually found around dwellings, its preferred habitat being the poultry yard, but in can also be found in pigsties, corrals and other places adjacent to human dwellings. In São Paulo State, Brazil, *T. sordida* was found establishing colonies inside houses[3, 8, 14]. In Goiás State, Formosa County, Brazil, specimens of this species of triatomids were found in a house by Carvalho et al[2]. However, these authors did not mention the developmental stage in which these insects were found. Mello[10] in 1976, has found adult specimens of *T. sordida* in houses in the same county. The author believes that, in this situation, the insects might have been attracted by light. In a wild environment *T. sordida* was found in São Paulo State by Correa et al[3] in 1959, Barreto[1] in 1966, Forattini et al[8], in 1971.

As for its place in the epidemiology of Chagas disease, *T. sordida* is considered a secondary vector of *Trypanosoma cruzi*[3, 4]. However, its significance was considered by Rocha e Silva et al[14]. and Forattini et al[8]. These investigators observed that the elimination of populations of *T. infestans* in a domestic environment with BHC favors an increase in populations of *T. sordida.*

Little is known about the biology of *T. sordida*. Pinto[13] was the first to study some aspects of the biology of this hemipterous insect. Dias[6], in 1955, reported briefly on the life cycle of this species in the laboratory. Perlowagora-Szumlewicz[11, 12] analysed some aspects of the biology of *T.sordida* under laboratory condition, and compared it with other species of triatomids.

It is evident that laboratory research is necessary in order to better understand the implications of *T. sordida* in the transmission of *T. cruzi*. Taking this fact into consideration, the author's objectives will involve a series of laboratory studies on several aspects of the

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biology of Triatominae from North part of Formosa County, Goiás State. This paper is the first report from series and it describes the life cycle of *T. sordida.*

MATERIAL AND METHODS

1. *Origin of the population studied*

The population of *T. sordida* studied in this paper was originated from a female insect caught in the field, already laying eggs. This female came from a place about 156 km north-east of Brasilia, DF, Brazil on the BR-020 highway. A poultry yard, approximately 12 m from a human dwelling, was the habitat where is was found. The number of individuals from first instar nymph to adult was 250, which corresponds to 82.1% of all the eggs laid by the original female.

2. *Maintenance of the population*

The population studied was fed once a week on pigeons. The insects were left on the bird for about 20 minutes, in a dark environment.

The population was kept in the following containers:

a) First and second instar nymphs – plastic containers measuring 5,5 cm in diameter by 5,0 cm in height.

b) Third, fourth and fifth instar nymphs – glass containers measuring 10,5 cm in diameter by 9,5 cm in height.

c) Adults – glass containers measuring 24,5 cm in diameter by 14,0 cm in height.

Inside the containers there were cardboard accordions and their openings were closed with an elastic-bordered screen.

The entire population was kept in an insectarium without light, 4 m long by 2,10 m wide by 3,20 m high.

The temperature and relative humidity were controlled by a thermohidrograph (With, Lambrecht KG). During the observation period the mean temperature was 23.7ºC and the relative humidity was 74,1%.

Daily observations were made and duly annotated.

For the statistical analysis of the cycle length and of the different stages, the number of observation days was grouped in a class/interval, the means being calculated in groups of data.

Compatibility test was used for the cases where a certain number of individuals had a different cycle length from the majority of the population studied.

RESULTS

The complete cycle length from egg to adult lasted an average of 213 days.

The egg incubation period is shown in table 1. The mean was 23.2 (± 1.4) (Table 3) with 82,5% of viable eggs (555 observed and 458 hatched).

The days of occurence of ecdyses, grouped in a class interval for the 5 stages are shown in table 2. Overall mortality was 18,8%.

The female/male ratio was 115/88 with a sexual rate of 1.3.

The ecdyses which lasted more than 100 days were as follows:

The metamorphoses of 3rd instar nymphs were observed at 115, 150, 178, 245, 248 days; the metamorphoses of 4th instar nymphs were observed at 113, 115, 135(2), 138, 144, 148, 150, 171, 186, 252, 285, 316, 323 days; the metamorphoses of 5th instar nymphs were observed at 80(2), 81(2), 83, 85, 87, 114, 120(2), 121, 142, 199, 255, 330(2), 341(2), 450(2) and 540 days.

The results of the compatibility test used in the analysis of the insects which had ecdyses higher than 100 days, indicated that these are not compatible with the majority of the population.

TABLE 1

Period of incubation of eggs of *T. sordida* under laboratory conditions.

Incubation days class interval	Eggs
9 – 11	0
12 – 14	24
15 – 17	43
18 – 20	77
21 – 23	113
24 – 26	81
27 – 29	59
30 – 32	23
33 – 35	24
36 – 38	6
39 – 41	8
Nº of viable eggs	458
Viable eggs (%)	82,5
Total	555

TABLE 2

Duration in days of the different evolutive stages of *T. sordida*

Ecdyses days (class int.) \ Evolutive Stage	NI	NII	NIII	NIV	NV
5 – 9	0	1	0	0	0
10 – 14	35	3	0	0	0
15 – 19	39	2	0	0	0
20 – 24	98	24	21	0	1
25 – 29	25	73	57	8	4
30 – 34	6	53	60	45	7
35 – 39	2	19	16	31	5
40 – 44	0	17	13	36	28
45 – 49	4	16	10	28	38
50 – 54	3	8	12	13	49
55 – 59	0	1	3	1	15
60 – 64	2	1	3	1	5
65 – 69	5	3	6	10	3
70 – 74	6	0	2	6	12
75 – 79	1	0	0	5	8
80 – 89	0	0	2	5	10
90 – 99	0	0	3	2	4
+100	0	0	5	14	14
Subtotal	226	221	213	205	203
Dead	24	5	8	8	2
Total	250	226	221	213	205

TABLE 3

Mortality and mean duration of different evolutive stages of *T. sordida*

Evolutive stages	Mean Duration (days)	Mortality (%)	Survival (%)
Eggs	23.2 (± 1.40)	–	–
N I	24.3 (± 1.30)	9.6	90.4
N II	32.8 (± 1.45)	2.5	97.8
N III	36.1 (± 1.50)	3.6	96.3
N IV	44.6 (± 1.85)	3.8	96.2
N V	52.0 (± 1.92)	0.9	99.0

COMMENTS

Pinto[13] briefly studying the biology of *T. sordida* under laboratory conditions, observed that the egg-adult cycle lasted for approximately 5 months.

Dias[6] found that the cycle length for *T. sordida* fed on chickens was 420-659 days after the eclosion of the eggs.

The results found in the present study, where the mean temperature and relative humidity were 23.7ºC. and 74,1% respectively, and the insects were fed on pigeons once a week, showed that the mean egg-adult cycle length was 213 days or approximately 7 months.

The occurence of ecdyses in number of days not compatible with the mean for the population studied can probably be explained as having been caused by physiological problems. These problems would be undoubtedly related to internal and individual changes, since the external conditions were not altered during the experiment. The halt in the development of some triatomids creating a longer period in days for the 3rd, 4th and 5th stages could have been caused by a temporary interruption of physiological reactions responsible for the ecdyses.

The viability found for eggs of *T. sordida* was similar to the data presented by Perlowagora[12] that is, 87,7%.

The survival in the immature stages which varied from 90,4% to 99,0% (Table 3) was superior to that found by Perlowagora[12] (around 89%).

The differences in cycle length, when compared to the results given by Pinto[13] and Dias[6] can be explained either by genetic differences, type of meal fed to the insects during the experiment, of by differences in temperature and humidity. Unfortunately, these two authors do not mention the laboratory conditions in which these experiments were carried out. Correa et al[5]. Studying the life cycle of *T. infestans* observed and confirmed the results of other investigators that the differences in cycle length for this species of insects are mainly related to temperature. This author obtained the complete cycle of *T. infestans* of 141 days at temperatures varying from 25 to 26ºC and 304 days at temperatures varying from 19 to 26ºC.

Relating the problem of the life cycle length of triatomids to the freqency of feeding, Freitas et al.[9] observed that *R. neglectus* had a shorter cycle when fed once a week (85,9 ± 3,8) than when fed every 14 days (96,7 ± 4,1).

RESUMO

Foi estudado no presente trabalho o ciclo biológico do Triatoma sordida. *A média da duração do ciclo de ovo a adulto foi 213 dias. A média de duração em dias para cada estágio foi 24,3 (± 1,30) para o primeiro, 32,8 (± 1,45) para o segundo, 36,1 (± 1,50) para o terceiro, 44,6 (± 1,85) para o quarto e 52,0 (± 1,92) para o quinto.*

A média do período de incubação dos ovos foi 23,2 (± 1,40).

A mortalidade em todos os estágios foi 18,8% e a viabilidade dos ovos foi 82,5%.

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