

# POST EMBRYONARY DEVELOPMENT AND LIFE-SPAN OF ADULT *GASTEROPHILUS NASALIS* (LINNAEUS, 1758) (DIPTERA: OESTRIDAE) IN LABORATORY CONDITIONS

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**SUMMARY:** The genus *Gasterophilus* (Leach, 1817) attack equids of different ages. The objective of this investigation was to analyze: larval weight, pupation period, emergence and adult longevity, from 3<sup>rd</sup> instar larvae of *G. nasalis* obtained from naturally infected horses from July 1994 to July 1996. The animals remained confined to the stables thereby facilitating larvae collection. From the 409 3<sup>rd</sup> instar larvae collected, 294 (71,88%) emerged of which 52,72% were males and 47,28% were females with a sexual ratio of 0,47. It was observed that larval weight varied from 80 to 340 mg, with a mean of 239 mg. Correlation analysis demonstrated that the weight of the larvae was not an indicator of the sex of the adults, females weighed  $240 \pm 40$  mg and males  $250 \pm 50$  mg, indicating that the body mass of the males did not influence the overall specimen weight. The pupal period of *G. nasalis* varied from 16 to 46 days, with a peak at the 27<sup>th</sup> day. The longevity of the 200 collected adults varied from one to nine days, indicating a higher frequency from the second to the fifth day (76,67%). The mortality index was higher on the fifth day.

**KEY-WORDS:** *Gasterophilus nasalis*, 3<sup>rd</sup> instar larvae, natural elimination, weights, pupation period, longevity, adults, equids.

## INTRODUCTION

Eight species of the genus *Gasterophilus* are known by the use of scanning electron microscopy of eggs: *G. haemorrhoidalis*, *G. inermis*, *G. intestinalis*, *G. meridionalis*, *G. nasalis*, *G. nigricornis*, *G. pecorum*, *G. termincinctus* (COGLEY, 1991).

Studies such as those of IHERING (1930), ROLIM FILHO (1932), SILVA JR. & PROENÇA (1934) and CORREA (1945) have pointed out the occurrence of *G. nasalis*, mainly in the South Region of Brazil, on most occasions, in horses belonging to the army.

In several Brazilian states, high prevalence has been reported, confirming the acclimating of *G. nasalis* in Brazil (OLIVEIRA *et alii*, 1972; LIGNON *et alii*, 1975; CODA *et alii*, 1982; MUNDIM *et alii*, 1992).

*Gasterophilus intestinalis* was found by GUIMARÃES *et alii* (1954) in the city of Cotia, State of São Paulo, in a horse farm, affecting stud animals recently imported from France, but this species did not adapt to our climate; in Brazil, the only species found was *G. nasalis*.

This work aimed at recording the weight of *G. nasalis* 3<sup>rd</sup> instar larvae naturally eliminated in faeces, the pupal period and life span of the adults in the Homogeneous Fluminense Microrregion of the Grande Rio, RJ.

## MATERIALS AND METHODS

Nine horses were used in the study, in a rotation system. Three of these were kept in stables for a period of 30 days, for recovery of *G. nasalis* 3<sup>rd</sup> instar larvae naturally eliminated in faeces. Faeces were collected twice daily (morning and afternoon), carried out for two years, from July, 1994 to July, 1996, in the microrregion of the Grande Rio, State of Rio de Janeiro.

The collected larvae were identified according to the key of ZUMPT & PATERSON (1953) and weighed in a precision electronic balance.

The 3<sup>rd</sup> instar larvae of *G. nasalis* recovered from the faeces were individually placed in transparent plastic cylinders, on top of a volume of sieved and moistened sand. The vessel was

sealed with fine mesh cloth until the emergence of the adults. Each cylinder was identified and observed daily, in the morning and afternoon, and the substrate lightly moistened. The day of emergence and sex of the emerged adults were recorded, and these adults were maintained inside the transparent vessel until their death was observed.

## RESULTS AND DISCUSSION

The weight of *G. nasalis* 3<sup>rd</sup> instar larvae naturally eliminated in faeces ranged from 80 to 340mg, with a higher frequency of weights between 200 and 300mg, corresponding to 83,3% and presenting higher numbers of larvae weighing between 210 and 250mg, with a mean of 239mg (Fig. 1). KLEM *et alii* (1997) observed upon necropsies that the weight of 3<sup>rd</sup> instar larvae varied from 30 to 310mg. In that weight variation are included 3<sup>rd</sup> instar larvae of different ages, being the heaviest those in the pre-pupal phase. The development of 3<sup>rd</sup> instar larvae in the horse takes 10 to 12 months, according to ALCAÍNO *et alii* (1980) in Chile. From all naturally eliminated larvae, the lightest ones that developed into adults weighed 130 and 140mg, representing 1,21%.

The mean body weight of the recovered larvae which developed into males did not differ from that of the specimens

which developed into females during the whole experimental period,  $240 \pm 40$ mg for females and  $250 \pm 50$ mg for males.

Data related to the weight of 2<sup>nd</sup> and 3<sup>rd</sup> instar larvae were reported by KLEM *et alii* (1997), after necropsying 34 equids.

The pupal period of *G. nasalis* 3<sup>rd</sup> instar larvae varied from 16 to 46 days, with a higher frequency between the 24<sup>th</sup> and 29<sup>th</sup> days, representing 51,22% and a peak on the 20<sup>th</sup> day, with 15,54% (Fig. 2). LAHILLE (1911) in Argentina, on the other hand, observed that the pupal period varied from 30 to 40 days. WELLS & KNIPLING (1937) reported in the United States a minimum of 16 days in a controlled environment room and 20 days at room temperature. PANITZ (1978), in the United States, observed a pupal period between 14 and 28 days. SILVA JR. & PROENÇA (1934) in Rio de Janeiro, on the other hand, placing six larvae onto moist wood shavings, obtained adults in 20 and 21 days. In São Paulo, ROCHA (1954) obtained hatching of 56 larvae in 15 to 25 days, with higher frequency on the 20<sup>th</sup> day. It is noteworthy that the pupal periods reported by the various authors are contained between the extremes obtained in the present study. In the State of Rio Grande do Sul, BRUM (1992) observed the pupal period varying from 23 to 28 days.

The recovery of adults was of approximately 71,88% out of 409 larvae eliminated in faeces; from these, 13, 94% did not emerge and 14,18% were non-viable 3<sup>rd</sup> instar larvae.

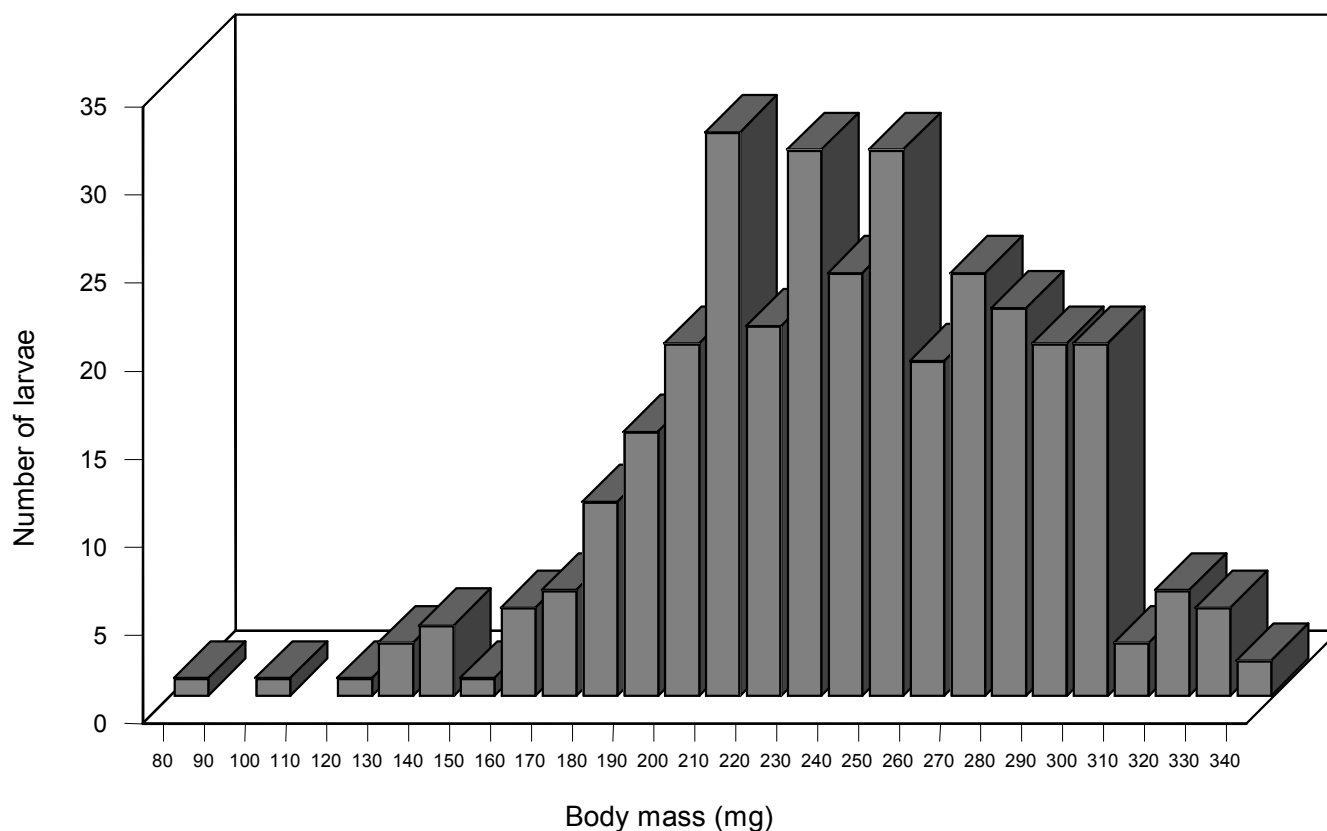


Fig. 1 – Total incorporated mass per 3<sup>rd</sup> instar larva of *Gasterophilus nasalis*, naturally eliminated, in the period of July, 1994 to July, 1996. EPPWONeitz, UFRRJ, Seropédica, RJ.

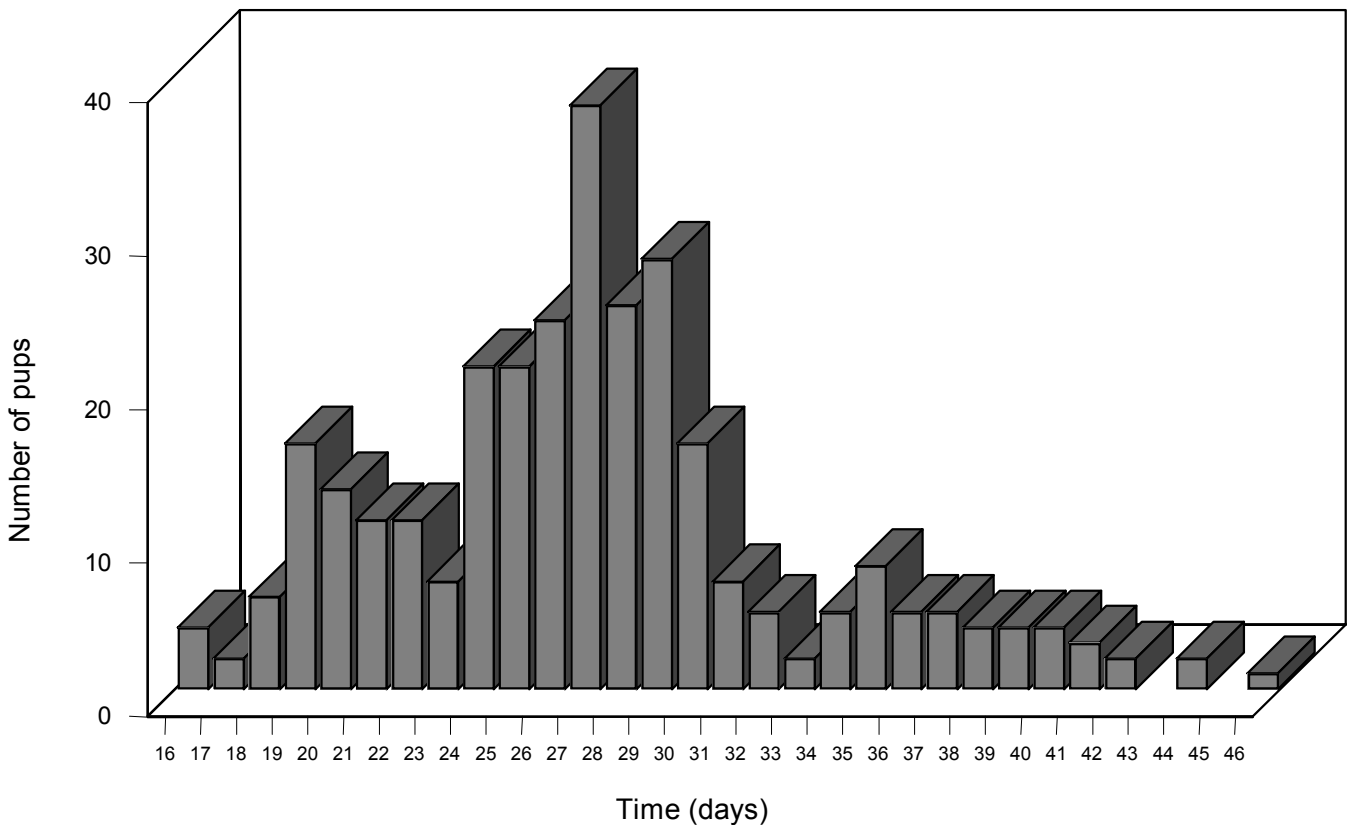


Fig. 2 – Duration of the development of isolated 3<sup>rd</sup> instar larvae of *Gasterophilus nasalis*, after the burying behaviour to the emergence of the adults, in laboratory conditions, in the period of July, 1994 to July, 1996. EPPWONeitz, UFRRJ, Seropédica, RJ.

From 294 emerged adults, 52,72% were males and 47,28% were females, with a sex ratio of 0,47; this value is in accordance with the standards for this variable in diploid dipterans.

The life span of 200 adults varied from one to nine days, with a higher frequency of survival between the second and the fifth days (76,67%), indicating a higher survival rate on the fifth day (32,17%) (Fig. 3). Considering males and females separately, male life span varied from one to seven days, with higher frequency on the fifth day; female survival varied from one to nine days, with higher frequency on the fifth day.

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## SUMÁRIO

O gênero *Gasterophilus* (Leach, 1817) acomete equídeos de várias idades. O objetivo do presente trabalho foi analisar os

parâmetros: peso das larvas, período pupal, emergência e longevidade dos adultos a partir de larvas de 3<sup>o</sup> instar de *G. nasalis* obtidas de cavalos naturalmente infectados no período de julho de 1994 a julho de 1996. Estes equínos permaneceram estabulados para facilitar a recuperação das larvas. Das 409 larvas de 3<sup>o</sup> instar recuperadas, 294 (71,88%) emergiram, originando 52,72% machos e 47,28% fêmeas, com razão sexual 0,47. Foi observado que o peso das larvas variou de 80 a 340 mg, com média de 239 mg, e pelo teste correlação mostrou que o peso das larvas não indicou o sexo dos adultos, para fêmeas  $240 \pm 40$  mg e machos  $250 \pm 50$  mg, indicando que a massa corporal dos machos não diferiu dos espécimens que originaram fêmeas. O período pupal de *G. nasalis* variou de 16 a 46 dias e com pico no 27<sup>o</sup> dia. A longevidade de 200 adultos variou de um a nove dias, indicando maior frequência no segundo ao quinto dia (76,67%), ocorrendo maior índice de mortalidade no quinto dia.

**PALAVRAS-CHAVE:** *Gasterophilus nasalis*, larvas de 3<sup>o</sup> instar, eliminação natural, peso, período pupal, longevidade, adultos, equínos.

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