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Short Communication

Effects of Temperature and Relative Humidity on the Egg Laying Pattern of *Rhipicephalussanguineus* (koch, 1844) Infesting Goats in Maiduguri.

BIU, A. A.[1], ABDULKADIR, M. A.[2] and AFI, S.H.[3]

[1]Department of Veterinary Microbiology and Parasitology.Faculty of Veterinary Medicine.P.O. Box 8136, University of Maiduguri, Maiduguri, Nigeria.[2&3] Department of Biological Sciences, Faculty of Science, University of Maiduguri. *Correspondingauthor: biuvet@yahoo.com.+23408023860852

INTRODUCTION

Ticks and tick borne diseases affect animal and man worldwide with significant economic losses. About 10% of the 867 known species of ticks are vectors of pathogens, with the brown dog tick *Rhipicephalussanguineus* as the most widespread tick in the world and a well recognized vector of many pathogens affecting dogs and occasionally humans (Jongejan and Uilenberg, 2004).

Climatic conditions are among the main factors influencing the biotic potential of ticks, and endemic stability is thus not attained in areas which are climatically marginal for the vector tick species. However, *Rhipicephalussanguineus*, to an extent an endophilic, monotropic, three host tick species, is a widespread tick, and is able to adopt different strategies for survival (Dantas-Torres, 2010).

This study was conducted to determine the egg laying pattern of *R. sanguineus* under the influence of different temperature and relative humidity conditions.

KEY WORDS: Temperature, Relative Humidity, Egg Laying,*Rhipicephalussanguineus*

MATERIALS AND METHODS

Twenty fully engorged adult female *R. sanguineus* were collected by handpicking from goats, into specimen bottles, taken to the Parasitology laboratory of the Faculty of Veterinary Medicine, University of Maiduguri, Nigeria, and identified using the descriptions of Walker *et al.,* (2007). Each tick was weighed using a sensitive Mettler AE 168 scale. Ten of each were placed into petri dishes and incubated under ambient and humidity chamber (dessicator) temperature (measured using a thermometer Lacoste[R] China) and relative humidity conditions of 27.4±2.58 (24-32)°C and 63.7±3.84(51-70%) and 25.5±2.16(23-30°C) and 90% respectively. Eggs were collected on each day upon commencement of oviposition using a clean needle, and spread over a slide with square markings like a counting chamber and counted under a stereoscopic microscope using a thumb pressed logical counter. The pre- and post- oviposition weight (grams), pre-oviposition and oviposition (days), peak oviposition (days), peak number of eggs laid, and total number of eggs laid were all recorded and data presented as mean ± SD with variations between ambient and dessicator conditions compared using the paired "t" test at 5% confidence interval (p=0.05) (Graph Pad Instat 1998).

RESULTS AND DISCUSSION

The results as indicated in Table I shows that *Rhipicephalussanguineus* maintained under ambient (room) humidity of 63.7±3.84(51-70%) and temperature of 27.4±2.58(24.32°C) had a pre-oviposition period of 18.1±10.26(9-41days) and oviposition period of 35.9±10.30(13-

45days), while those maintained in the dessicator at 90% relative humidity and temperature of 25.5±2.16(23-30°C) had a shorter pre-oviposition period of 15.9±11.18(9-37days) and an oviposition period of 37.1±11.18(16-44days).These findings in this study has revealed that the dessicator conditions of temperature and relative humidity favoured a shorter preoviposition and oviposition period, with a greater number of eggs laid and a shorter peak oviposition period when compared with the ambient conditions. This agrees with the findings of Mohammed *et al.,* (2006); Dantas-Torres, (2010); Adejinmi, (2011); Adejinmi and Akinboade, (2011) who explained that these parameters are directly correlated with extrinsic factors. Binni *et al.*, (2010) has also indicated that the developmental period of ticks is influenced by the interaction of both temperature and relative humidity and that ≥90% relative humidity or temperature range of between 27 and 36°C seem to be the optimum requirements for most tick species. The total egg lay was 57,564 with a mean of 1066±938.6 for ambient and 59,687 with a mean of 1125.8±1254.8 for dessicator conditions ($p<0.05$) with a peak of 3390 and 4655 eggs on days 17 and 10 respectively. The number of eggs laid by each female is determined by her weight, and length of oviposition period which is increased under low temperature resulting into a low egg production (Binni *et al.*, 2010).

In experimental trials the removal of ticks daily from vials for separation and counting of eggs can interrupt oviposition, which then restarts the day after, although loses in terms of egg production efficiency are usually minor (Dantas-Torres, 2010).

CONCLUSION

This study has shown that the biotic potential of *Rhipicephalussanguineus*is influenced by factors of humidity and temperature, and stressful temperature and humidity can extend the life cycle of ticks whose response to these factors remarkably determines their survival and abundance in the environment.

Table 1. Egg laying pattern of *Rhipicephalussanguineus* based on temperature and relative humidity conditions.

Parameters Recorded	Mean ± Standard Deviation (range) Dessicator	Ambient
Temperature (°C)	25.5±2.16 (23-30)	27.4±2.58 (24-32)
Relative Humidity (%)	90 (-)	63.7±2.84 (51-70)
Pre oviposition weight (grams)	0.175±0.04 (0.1-0.25)	0.25±0.1 (0.1-0.5)
Post oviposition weight (grams)	0.064±0.015 (0.03-0.09)	0.114±0.06 (0.05-0.25)
Pre oviposition period (days)	15.9 ± 11.18 (9-37)	18.1 ± 10.26 (9-41)
Oviposition period (days)	37.1±11.18 (16-44)	35.9±10.30 (13-45)
Peak oviposition period	Day 10	Day 17
Total number of eggs laid	59,687 (1125.8±1254.8)	57,564 (1066±938.6)
Peak number of eggs laid	4655	3390

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