

## WEIGHT DIFFERENCES BETWEEN *Boophilus microplus* (IXODOIDEA:IXODIDAE) FROM BRAZIL AND FROM CUBA

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**ABSTRACT:** Weights of engorged females and recently molted adults *Boophilus microplus* (both females and males) from Cuba and Brazil were compared by means of t-Student tests. It was observed that Brazilian ticks were always significantly heavier than those from Cuba. Some comments about the possible causes, significance of observation and further researches to be performed are offered.

(Key words: ticks; weight; *Boophilus*; *Ixodoidea*; *Ixodidae*)

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### DIFERENCIAS DE PESO ENTRE *Boophilus microplus* (IXODOIDEA:IXODIDAE) DE BRASIL Y DE CUBA

**RESUMEN:** Se comparó el peso de hembras repletas y adultos recién mudados (hembras y machos) de *Boophilus microplus* de Cuba y de Brasil mediante pruebas de t de Student. Se observó que las garrapatas de Brasil fueron siempre significativamente más pesadas que las de Cuba. Se comenta sobre las posibles causas y significado de este fenómeno y de las futuras investigaciones a realizar.

(Palabras clave: garrapatas; peso; *Boophilus*; *Ixodoidea*; *Ixodidae*)

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### INTRODUCTION

Ecology has been linked to divergence and speciation, but debates about evolution in sympatry have often eclipsed its importance. Nevertheless, recent studies on diverse taxa have suggested that natural selection caused by shifts in ecology or invasion of novel habitats could develop in extremely rapid rates of evolutionary divergence. Experimental approaches linking rapid ecological divergences are scarce, though recent papers indicate those are the best approaches to be used (7).

In parasites, number of diversifying factors is potentially larger than in free living organisms, because host-parasite coevolution (5). Otherwise, there have been relatively few traditional phylo-geographical studies on non-free living species (1). It was seen that when *Boophilus microplus* from Australia and from South Africa were crossed, a high degree of infertility and of sterile hybrids were obtained (11). Also, Davey

*et al.* (2) looked for differences in weight on *B. microplus* ticks from different areas of Mexico and USA, including Puerto Rico, and found that weights of ticks varied with location. In the present paper, it was reported on a weight comparison of recently molted *B. microplus* (females and males) and engorged females from Cuba and from Brazil.

### MATERIALS AND METHODS

Holstein calves were infested with groups of 10 000 *B. microplus* larvae. At 13 and 14 days after infestation, nymphs were collected and incubated at 28°C and relative humidity over 80%. Adults were sexed and weighed in an analytical balance (P=0.0001g). Engorged females were taken from the floor of the stable and similarly weighed.

Statistical Analysis.— In each category, mean (m) in grams (g) or in milligrams (mg) and standard deviation (SD) were calculated and any weights not in

the interval  $m \pm 2*(SD)$  were discarded. The  $m$  and  $SD$  were then recalculated. In all groups, a t-Student test was done. Before mean comparison, a test of variance homogeneity was performed.

## RESULTS

Table 1 shows number of ticks utilized within each category and country of the experiment, while Table 2 summarizes the comparative results.

**TABLE 1.** Number of ticks by country and by category./ Número de garrapatas por país y por categoría

Country	EF	RMF	RMM
Cuba	235	45	26
Brazil	173	47	39

EF=Engorged females/*Hembras repletas*;

RMF=Recently molted females/*Hembras recién mudadas*;

RMM=Recently molted males/*Machos recién mudados*

**TABLE 2.** Weight means and standard errors (SE) by categories./ Valores medios de peso y errores estándar por categorías

EF		
Country	$\mu$ (g)	SE
Cuba	0.2339 <sup>a</sup>	0.0029
Brazil	0.2587 <sup>b</sup>	0.0034
RMF		
Country	$\mu$ (mg)	SE
Cuba	1.0222 <sup>a</sup>	0.0258
Brazil	1.5064 <sup>b</sup>	0.0359
RMM		
Country	$\mu$ (mg)	SE
Cuba	0.7231 <sup>a</sup>	0.0305
Brazil	0.8692 <sup>b</sup>	0.0290

EF=Engorged females/*Hembras repletas*;

RMF=Recently molted females/*Hembras recién mudadas*;

RMM=Recently molted males/*Machos recién mudados*

Means with diverse superscripts differ significantly with  $P < 0.05$ ./ *Medias con super índices distintos difieren significativamente con  $P < 0.05$ .*

## DISCUSSION

In all categories, Brazilian ticks were heavier than Cuban ones. Geographical isolation could be invoked as a possible explanation of this divergence as ecological conditions of Rio de Janeiro are somewhat

different to those of Havana. Otherwise, some authors (4,8) consider that processes of ecological, sexual, and spatial differentiation can interact to create reproductively isolated lineages without geographical isolation. Davey *et al.* (2) found ovipositional and morphological differences between *B. microplus* from different sites of the USA-Mexico border and from Puerto Rico. Also, they verified that ticks raised in laboratory were the heaviest and ticks from Puerto Rico the lightest. Besides, these authors encountered morphological differences between males of these sites. However, in a study in USA (9), four natural colonies and four laboratory colonies of *B. microplus* were subjected to electrophoretic analysis to determine levels of genetic similarity and genetic variability. Results have shown that high genetic similarity ( $I=0.984 \pm 0.012$ ) and low genetic variability ( $h=0.092 \pm 0.008$ ) exist among these eight populations. Recently (10), in 30 *B. microplus* strains from different sites of Brazil, Argentina, Colombia, Venezuela and Uruguay, variations were seen in *bm86* and *bm95* genes that could explain the variable efficiencies of recombinant vaccines derived from the *Bm86* and *Bm95* proteins in different *B. microplus* strains.

Otherwise, differences in eggs weight between *B. microplus* from Brazil and from Cuba also seem to exist according to Labruna *et al.* (6) report: mean egg weight=0.0050 g and De la Vega (3) results: mean egg weight=0.0044 g. Again, weights from Brazil are higher than those from Cuba. Wilding *et al.* (12) affirmed that speciation requires the acquisition of reproductive isolation, which is still to be proven in the present species from Cuba and from Brazil. Present results could not be interpreted as initial signs of speciation until works about genetic similarity and variability and about sexual behavior and the output of cross-matings of *B. microplus* of both countries were performed.

## ACKNOWLEDGEMENTS

To Mr. Edward Deutsch for the revision of this paper. To Dr. Jorge de la Cruz for his valuable advices.

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(Recibido 20-2-2006; Aceptado 18-3-2006)

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