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SEX-BASED DIFFERENCES OF THE GUT AND SALIVARY GLAND INDICES IN THE COCKROACH, *PERIPLANETA AMERICANA**

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Gravimetric studies on the cockroach *Periplaneta americana* reveal remarkably high weight and histosomatic index of salivary apparatus in the female as compared to the male.

INTRODUCTION

The female insect has to satisfy vitellogenic nutritional pressures besides the vegetative requirements which ultimately find expression in higher quantum of food intake. This may lead to a sexual dimorphism in digestive gland index which has not hitherto been examined in insects. In the present communication we report the differences in indices of salivary apparatus and gut of the cockroach *Periplaneta americana*.

MATERIALS AND METHODS

The cockroaches collected from domestic habitats were kept in the vivaria. Adults of both sexes were weighed to the nearest milligram. The salivary apparatus and gut were dissected out, adhering water blotted by filter paper and weighed to the nearest milligram. The gut was cut open and contents removed by rinsing in saline. The emptied gut was reweighed after blotting. The corrected body weight was obtained by subtracting the weight of the gut contents from the body weight determined earlier. The histo-somatic indices (HSI) were calculated for the salivary apparatus and empty gut as the weight of the tissue percent corrected somatic weight. The weights and histo-somatic indices were expressed as sexual dimorphism indices (SDI) applying the formula: SDI =(Female/Male - 1) x 100. The regressions of the tissue weights and HSI's on the somatic weight were computed according to standard statistical procedures (PILLAI & SINHA, 1968).

RESULTS AND DISCUSSION

The total individual tissue weight and HSI of salivary apparatus showed profound sex-based differences (Table 1) whereas the gut weight and its HSI did not exhibit statistically significant sex-based differences. The male : female (M:F) ratios of the somatic weight, gut weight and its HSI were considerably lower than those of the salivary apparatus and its HSI. These sex-based differences were more clearly illustrated by the SDI's (Table 2). The SDI's of gut weight and gut HSI were low and not statistically significantly different from the SDI of somatic weight. But the SDI's of salivary apparatus and its HSI were very high and were significantly different from the SDI's of somatic weight, gut weight and gut HSI.

The regression coefficients of the female

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TABLE 1. Sex differences in histo-somatic indices of salivary apparatus and gut in *Periplaneta americana*.

Parameter	Male	Female	t	df	P	M:F Ratio
Somatic weight in grams	0.964± 0.103(11)	1.241± 0.123(14)	5.931	23	<0.001	100:128.7
Gut weight in grams	0.120± 0.08865(15)	0.1487± 0.04535(10)	1.351	23	NS	100:123.9
Salivary apparatus weight in grams	0.0064± 0.00197(11)	0.0196± 0.00582(14)	7.188	23	<0.001	100:306.2
Histosomatic index of gut (G-HSI)	11.361± 4.422(15)	10.933± 2.307(10)	0.278	23	NS	100:96.2
Histosomatic index of salivary apparatus (SA-HSI)	0.67± 0.217(11)	1.58± 0.491(14)	5.701	23	<0.001	100:235.8

Values under 'Male' and 'Female' are mean ± standard deviation. The numbers of determinations are parenthesized.

t : Students' 't' test value for significance of difference between the compared means: d.f : numbers of degrees of freedom; P : level of significant difference between compared means; NS: not significant.

TABLE 2. Sexual dimorphism indices (SDI) in the cockroach *Periplaneta americana*.

Parameter	SDI	
Somatic weight (SW)	+ 18.96 ± 10.7	(10)
Salivary apparatus weight (SAW)	+ 241. 2 ± 119.9	(10)
Histosomatic index of salivary apparatus (SA-HSI)	+ 155. 6 ± 96.61	(10)
Gut weight (GW)	+ 44.808± 66.7	(10)
Histosomatic index of gut (G-HSI)	+ 14.799± 50.67	(10)

	t	d.f.	P
SW-SAW	5.837	18	<0.001
SW-SA. HSI	4.444	18	<0.001
SAW-SA. HSI	1.758	18	NS
SW-GW	0.679	18	NS
SW-GHSI	0.135	18	NS
GW-GHSI	0.616	18	NS
SAW-GW	4.527	18	<0.001
SAHSI-GHSI	4.082	18	<0.001

Values of SDI are means ± standard deviations with numbers of estimation in parentheses.

salivary apparatus weight was positive ($b = +0.00476$) while the 'b' for male was negative ($b = -0.00174$). However these regression coefficients were not statistically significant. Nevertheless the regression lines of the females were at higher levels than those of the males.

One feature of interest which emerges from the present work is the remarkably higher weight and HSI of salivary apparatus in female which may indicate a higher amylolytic potentiality.

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