

## SEX RATIOS OF NATURAL POPULATION OF IXODID TICKS IN PASTURE GROWN IN BANGLADESH

M. Giasuddin, M. M. Haq<sup>2</sup>, M. M. H. Mondal<sup>2</sup> and N. R. Sarker<sup>1</sup>

System Research Division, Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh

### Summary

The study on the sex ratios of natural population of Ixodid ticks in pasture was conducted in the Bangladesh Agricultural University Campus, Mymensingh, from 1988 to June 1990. The samples were collected from the five grazing fields consisting of five different vegetations. Dragging methods were used for the collection of samples. In 24 months of observations a total of 1113 ticks of two different species, *Boophilus microplus* (670), *Haemaphysalis bispinosa* (443) were collected and their sex ratio was determined. Females were recorded higher in both *B. microplus* and *H. bispinosa*.

(Key Words : Ixodid Ticks, Dragging, *Boophilus microplus*, *Haemaphysalis bispinosa*)

### Introduction

Parasitism is one of the main constraints in cattle rearing in Bangladesh (Jabbar and Green, 1985). The hot and humid climate like Bangladesh is conducive to the maintenance and dissemination of parasites. Ticks are distributed all over the world and live in blood and lymph of all kinds of vertebrate animals. The implication of Ixodid sex ratio in cattle raising were reported by many researchers and it causes a considerable amount of blood loss, irritation and annoyance to animal which results in disturbed feeding and may lead to retarded growth, loss of weight decreased milk and meat production (Basu 1951). The annual economic loss caused by *Boophilus microplus* in Australia of US \$ 65 million Springella (1974). It also transmit numerous pathogenic organisms which pose serious threats to both public health and livestock industry.

Ticks spend a long period of their life cycle on pasture. So, it is therefore, necessary to have some information about this part of their life cycle. The study was undertaken to observe the male and female ratios of ixodid ticks on pasture, which can help to undertake

appropriate control measures for the destruction ticks population.

### Materials and Methods

The experiment was carried out in the Bangladesh Agricultural University Campus, Mymensingh from July 1988 to June 1990. Five grazing fields having five different vegetations and open for grazing throughout the year were selected for this experiment. All these grazing fields were exposed to direct sunlight and the height of the grass varied from season to season. During Winter season they were minimum in growth.

The specimen were collected from the grazing fields by dragging (flagging) method (Boardman, 1944; Milne, 1945 and Arthur, 1962). The flag was one square meter and was made of a white cotton flannel sheet. A stick was attached on one end of the flag and a convenient length of rope was tied to the ends of the stick for dragging the flag. The flag was dragged slowly over the grass surface.

The sample was collected from 10 meter (m) long and 1 m wide plots at a time. After 5 m was dragged the sheet was examined and sample was removed with the help of a pair of fine forceps. The number of ticks collected from the 10 m plots were counted and preserved for identification. All the five fields were sampled randomly twice in a month and different places were selected randomly for dragging.

After collection, the ticks were preserved in hot

<sup>1</sup>Address reprint requests to Dr. N. R. Sarker, Scientific Officer, Bangladesh Livestock Research Institute, Savar-1341, Dhaka, Bangladesh.

<sup>2</sup>Professor, Department of Parasitology, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.

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glycerine alcohol.

Identification of the ticks were made under dissecting microscope on the basis of the descriptions given by Hoogstraal et al. (1965) and Razzak (1969).

#### Data analysis :

Analysis of variance and DMRT of sex ratios of ixodid ticks were done by using General Linear Model by SAS/PC package (1988).

### Results and Discussion

In this study two species of ticks namely *Boophilus microplus* and *Haemaphysalis bispinosa* were collected from the five different vegetations. Razzak and Shaikh (1969) and Rahman and Mondal (1985) also recorded these ticks from cattle of Bangladesh. A total of 1113 ticks were collected from July 1988 to June 1990. Seasonal influence on the incidence and sex ratio of *B. microplus* and *H. bispinosa* in pasture were shown in table 1 and 2. During Winter season the highest incidence were recorded and lowest during the Monsoon.

The male:female ratio of *B. microplus* and *H. bispinosa* was 1:1.74 and 1:1.73, 1:1.55 and 1:1.9, 1:1.66 and 1:2, 1:1.46 and 1:1.46 in Winter, Summer, Monsoon and Autumn seasons respectively in 1988-89. Whereas in

1989-90 the ratio was 1:1.33 and 1:1.45, 1:1 and 1:1.47, 1:3.5 and 1:1.5, 1:1.18 and 1:1, 14 in Winter, Summer, Monsoon and Autumn seasons respectively.

Monthly sex ratio in population on *B. microplus* and *H. bispinosa* are shown in table 3. The highest percentage (100) of female *B. microplus* and *H. bispinosa* were recorded in the month of June and July when only a few ticks was collected and lowest percentage (42.86) of *B. microplus* was in the month of May 1990. In *H. bispinosa* lowest percentage (33.33) female was recorded in the month of August 1990. Total female percent of *B. microplus* was 61.94 and 55.71, whereas in *H. bispinosa* it was 62.98 and 57.46 in 1988-89 and 1989-90 respectively (table 3). Razzak and Shaikh (1969) collected more female than male in case of *B. microplus* and *H. bispinosa* from the body of cattle. Whereas Kolonin (1978) and Yousfi-Monod (1985) reported that the sex ratio of ticks in pasture was near 1:1.

Rawlins (1979) found that the *B. microplus* appeared to oviposit a maximum number of eggs when temperature ranges from 24-26.5°C in Jamaica which is correlated with this present study.

Annual sex ratio of different stages of ticks are shown in table 4. The highest number (236) female larvae of *B. microplus* was collected in 1988-89. The lowest number (55) was collected male larvae of *H. bispinosa* during

TABLE 1. INFLUENCE OF SEASONS ON THE INCIDENCE OF IXODID TICKS IN PASTURE (FROM JULY 1988 TO JUNE 1989)

Season	Meteorological data			Total no. of dragging days in a season.	<i>Boophilus microplus</i>			<i>Haemaphysalis bispinosa</i>			
	Mean Temp. °C	Mean Rainfall mm	Mean R. H. %		Average no of ticks in 50 sqm	Percentage of total collection	Sex ratio Male:Female	Average no of ticks in 50 sqm.	Percentage of total collection	Male	Female
Winter (December to February)	19.57 (17.42-21.11)	8.2 (1.4-16.8)	76.82 (71.46-82.64)	6	33.33 <sup>a</sup> (200)	52.49	1: 1.74 (73) (127)	22.33 <sup>a</sup> (134)	51.15	1: (49)	1.73 (85)
Summer (March to May)	27.38 (24.53-28.9)	133.37 (2.0-374.5)	74.36 (69.77-81.35)	6	13.17 <sup>b</sup> (79)	20.73	1: 1.55 (31) (48)	9.67 <sup>b</sup> (58)	22.14	1: (20)	1.9 (38)
Monsoon (June to August)	28.59 (28.38-28.85)	452.03 (389.7-572.8)	87.55 (86.87-88.61)	6	2.67 <sup>c</sup> (16)	4.20	1: 1.66 (6) (10)	1.0 <sup>c</sup> (6)	0.38	1: (2)	2 (4)
Autum (September to November)	26.66 (24.03-28.75)	198.2 (133.4-266.0)	82.72 (79.97-85.13)	6	14.33 <sup>b</sup> (86)	22.57	1: 1.46 (35) (51)	10.67 <sup>b</sup> (64)	24.43	1: (26)	1.46 (38)

Figure in the parenthesis shown the total number except meteorological data where lowest and highest figure was given. Means with the same letter are not significantly different ( $p < 0.05$ ).

1989-90. In this study larva and nymph of *H. bispinosa* was collected. Females are found clearly dominant in all stages of ticks of both *B. microphes* and *H. bispinosa* and more ticks of both male and female were collected in the

year 1988-89 than 1989-90. These less number of ticks collection may be due to more rainfall (273.66 cm) during the year 1989-90.

TABLE 2. INFLUENCE OF SEASONS ON THE INCIDENCE OF IXODID TICKS IN PASTURE (FROM JULY 1989 TO JUNE 1990)

Season	Meteorological data			Total no. of dragging days. in a season.	<i>Boophilus microphes</i>			<i>Haemaphysalis bispinosa</i>				
	Mean Temp. °C	Mean Rainfall mm	Mean R. H. %		Average no of ticks in 50 sqm	Percentage of total collection	Sex ratio		Average no of ticks in 50 sqm.	Percentage of total collection	Sex ratio	
							Male	Female			Male	Female
Winter (December to February)	24.23 (18.96 – 28.36)	26.4 (0.0 – 58.0)	76.68 (74.89 – 78.61)	6	24.5 <sup>a</sup> (147)	50.87	1: 1.33 (63) (84)	12.33 <sup>a</sup> (74)	40.88	1: 1.45 (30) (44)		
Summer (March to May)	25.31 (22.81 – 27.37)	205.10 (65.2 – 448.1)	79.58 (75.16 – 83.10)	6	8.33 <sup>a</sup> (50)	17.30	1: 1 (25) (25)	7.0 <sup>a</sup> (42)	23.20	1: 1.47 (14) (25)		
Monsoon (June to August)	28.61 (28.38 – 28.97)	456.37 (188.2 – 775.7)	86.99 (84.81 – 88.17)	6	1.5 <sup>e</sup> (9)	3.11	1: 3.5 (2) (4)	0.83 <sup>e</sup> (5)	2.76	1: 1.5 (2) (3)		
Autumn (September to November)	26.09 (23.09 – 27.96)	224.37 (0.0 – 396.6)	84.72 (79.80 – 89.13)	6	13.83 <sup>b</sup> (83)	28.72	1: 1.18 (38) (45)	10.0 <sup>a</sup> (60)	33.15	1: 1.14 (28) (32)		

Figure in the parenthesis shown the total number except meteorological data where lowest and highest figure was given. Means with the same letter are not significantly different ( $p < 0.05$ ).

TABLE 3. MONTHLY SEX RATIO IN POPULATION OF *B. MICROPHES* AND *H. BISPINOSA* (FROM JULY 1988 TO JUNE 1990)

Month	<i>Boophilus microphes</i>						<i>Haemaphysalis bispinosa</i>					
	Male		Female		Percent female		Male		Female		Percent female	
	a	b	a	b	a	b	a	b	a	b	a	b
July	1	0	3	3	75	100	0	0	2	1	100	100
August	3	2	5	2	62.5	50	1	2	1	1	50	33.33
September	4	3	5	3	55.56	50	2	1	3	3	60	75
October	10	9	22	12	68.75	57.14	8	8	14	6	63.64	42.86
November	21	26	24	30	53.33	53.57	16	19	21	23	56.76	54.76
December	23	27	49	42	68.05	60.87	19	11	28	21	59.57	65.63
January	29	19	48	23	62.34	54.76	17	10	31	13	64.58	56.52
February	21	17	30	19	58.82	52.78	13	9	26	10	66.67	52.63
March	17	15	22	16	56.41	51.61	9	12	23	16	71.88	57.14
April	13	6	24	6	64.86	50	11	4	15	6	57.69	60
May	1	4	2	3	66.67	42.86	0	1	0	3	6	75
June	2	0	2	2	50	100	1	0	1	1	50	100
Total	145	128	236	161	61.94	55.71	97	77	165	104	62.98	57.46

a. July 1988 to June 1989.

b. July 1989 to June 1990.

TABLE 4. ANNUAL SEX RATIO IN DIFFERENT STAGE OF TICKS

Year	<i>Boophilus microphes</i>		Larva		<i>Haemaphysalis bispinosa</i>		Total	
	Larva		Male	Female	Nymph		Male	Female
	Male	Female			Male	Female		
1988-89	145 (38.06)	236 (61.74)	66 (37.29)	111 (62.71)	31 (36.70)	54 (65.53)	97 (37.02)	165 (62.98)
1989-90	128 (44.29)	161 (55.71)	55 (44)	70 (56)	22 (39.28)	34 (60.71)	77 (42.54)	104 (57.46)
Total	273 (40.75)	397 (58.81)	121 (40.07)	181 (59.93)	53 (37.59)	88 (62.41)	174 (29.28)	269 (60.72)

Figure in the parenthesis indicates the percentage.

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