دراسة وبائية على التهابوسوما وطفيليات الدم الاخرى
فى الفار الشوكى القاهرى فى شمال الوجه القبلى

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تم فحص الفار الشوكى القاهرى فى منطقة بنى سويف لطفيليات الدم فى المواسم الاربع . وقد بينت تلك الدراسة ان هناك علاقة وطيدة بين انتشار الثهابوسوما ومعدلات كثافة البراغيث والتغيرات الجوية الموسميه . وقد تم اكتشاف خمسة أنواع اخرى من الطفيليات منها نوع وجد طول العام هو البارثونيلا الدموية اما الانواع الاخرى وهى السيبياتوزون والايباريثروزون والانابلازما واللوبيات فقد كان ظهورموسميا ، مما يوصى بضرورة امتداد الدراسة لعام كامل حتى يمكن اكتشافها . ويمكن الاستفادة من هذه الدراسة ايضا فى معرفة سلوك مرض أخطر مثل الطاعون الذى تنقله البراغيث ايضا من الفئران .

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A STUDY ON THE EPIDEMIOLOGICAL STATUS OF TRYPANOSOMES AND OTHER BLOOD PARASITES OF THE CAIRO SPINY MOUSE IN NORTHERN UPPER EGYPT

(With Two tables)

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SUMMARY

The seasonal prevalence of the blood parasites of the spiny mouse, Acomys cahirinus was studied in Beni Swif Northern Upper Egypt. The seasonal variations in trypanosoma-infected rats were associated with parallel fluctuations in the flea indices, probably influenced by the prevailing climatic conditions. Certain differences were also observed between the two sexes and between the immature and adult hosts. Further biological studies are recommended to explain such differences.

Simultaneously, Haemobartonella was also detected all the year round. Other blood parasites such as Eperythrozoon, Hepatozoon, Anaplasma, and Spirochaeta were restricted to certain seasons of the year. This denoted the importance of a whole year study to determine the proper prevalence of certain blood parasites which may show themselves periodically, likely based on the prevalence of the intermediate hosts which are primarily affected with the climatic conditions.

INTRODUCTION

Studies on the ecology of blood parasites of rats and mice, especially flea-borne trypanosomes, would throw further light on the transmission and ecology of rather more important flea-borne diseases such as plague, which ceased to occur in Egypt, but still virtually liable to invade this country as pointed out by KAMAL (1941).

The present study was carried out in 1975 on the blood parasite of the Cairo spiny mouse, Acomys cahirinus (E. GEOFFROY and St. HILAIRE), in Beni-Swif area in Northern Upper Egypt; being the most common species of domestic rodents in this area (ARAFA, 1968).

MATERIAL AND METHODS

Six villages representing the prevailing environmental conditions in this territory were seasonally investigated . Baited wire-box traps of the usual spring-door type, one hundred per village were distributed in the evening and collected early in the morning. Trapping was conducted for two successive nights each season.

Mice were chloroformed, blood-sampled from the tail and heart, identified, sexed and examined for maturity status as revealed by either the descent of testicles in the scrotal sacs in males or the perforation of the vagina in females. Thereafter, they were combed using a hard tooth brush in an enamel white pan. Fleas were collected, counted and preserved in vials containing 70% alcohol for further identification. Female animals were then autopsied and the bifid uterus was examined for the gravidity status.

Thin Giemsa-stained blood films prepared in duplicate from the tail and heart blood were microscopically examined, at least one hundred microfields per slide. These data, together with the meteorological data, were tabulated and analysed.

RESULTS AND DISCUSSION

Out of 346 spiny mice examined, only 2.9% were found positive for Trypanosoma, 0.9% for Hepatozoon , 3.8% for Haemobartonella, 1.4% for Eperythrozoon, 4.3% for Anaplasma, and 0.3% for Spirochaeta.

The infection rate of this small mammal with trypanosomes is much lower than that encountered in the white-bellied rat, Rattus rattus frugivorus in Faiyum area (ARAFA et al., 1975), the alexandrine rat, Rattus r. alexandrinus in the Nile Delta (ARAFA et al., under publication), and Rattus rattus and Rattus norvegicus in Alexandria area (NASR et al., under publication). These differences might be correlated with the flea indices, being highest on Rattus norvegicus, Rattus r. alexandrinus, and Rattus r. frugivorus and lowest on Mus musculus and Acomys cahirinus as shown by ARAFA (1968).

Seasonal observations on trypanosomes denoted that the infection rates were highest during autumn and winter (5.0%& 4.6% respectively), associated with the highest flea indices (0.27 & 0.01 respectively), propably effected by better climatic conditions. The average maximum and minimum temperature during autumn were 32.2°C, and 9.3°C, and during witer 21°C and 5.2°C respectively. The relative humidity during the former season was 36%, and during the latter 40% (Table 1).

During spring, the rate dropped to 0.9%, and during summer to 3.0%, associated with negligible flea indices. The relative humidity was remarkably reduced from 40.0% in winter to 26.3% in spring and 26.7% in summer, whereas the maximum and minimum temperatures were of the following order, 34.6°C and 8°C during spring, and 36.8°C and 19.1°C during summer respectively. Again this confirmed the influence of the relative humidity on the prevalence of flea-borne diseases.

With regard to the sex of the host, no significant difference was detected at large between males and females

infected with Trypanosoma. (3.0% & 2.8% respectively). Nevertheless, on seasonal bases, the infection rate of males was higher in spring (2.7%) and autumn (20%) as compared to females, which showed only occasional infection. The reverse was mostly observed during summer and winter. This indicated that sex alone might have no role except under certain climatological condition probably due to the seasonal activity of the host and its confinement to nests and consequently to more frequent flea bites. The ratio between male and female rates during summer and winter were of the following order, 1.9% to 3.8%; and Zero to 8.8% respectively.

As for other blood parasites, the highest infection rate with Haemobartonella was encountered in spring, whereas Eperythrozoon infection was restricted to winter, Anaplasma to autumn, Hepatozoon to winter also, and Spirochaetes to summer (Table 2). This stresses the importance of a whole year study to determine the proper prevalence of certain blood parasites which might show themselves periodically, likely based on the prevalence of the intermediate hosts which are definitely affected with variations of climatic conditions.

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Table 1

Seasonal infection rate of Trypanosomes in Acomya cahirinus in Northern Upper Egypt in 1975

	Trypanosome infection rate %						Flea index *	Temperature		R. H.
	Males		Females		Total			Mx.	Mn.	%
	No.	% infect.	No.	% infect.	No.	% infect.				
Spring (March - May)	37	2.7	73	0	110	0.9	0	34.6	8.0	26.3
Summer (June - Aug.)	53	1.9	78	3.8	131	3.0	0	36.8	19.1	26.7
Autumn (Sept.-Nov.)	10	20.0	30	0	40	5.0	0.27	32.2	9.3	36.0
Witer (Dec. - Feb.)	31	0	34	8.8	65	4.6	0.01	21.0	5.2	40.0
Total	131	3	215	2.8	346	2.9				

* Flea Index : Average number of fleas/mouse.

Table 2

Seasonal Infection rate of blood parasites in Acomya cahirinus in Northern Upper Egypt in 1975.

	No. Exam.	Peroentage of infection				
		Hepatozoon	Haemobar-tonella	Eperythro-zoon	Anaplasma	Spiroohaeta
Spring	110	0	7.3	0	0	0
Summer	131	0	2.3	0	0	0.7
Autumn	40	0	2.5	0	40.0	0
Winter	65	4.6	1.5	7.7	0	0
Total	346	0.9	3.8	1.4	4.3	0.3