

RUMEN FLUKES OF RUMINANTS

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ن الرحيم

((قالوا سبحانك لا علم لنا الا ما علمتنا

انك انت العظيم الحكيم))

صدق الله العظيم

- آية :

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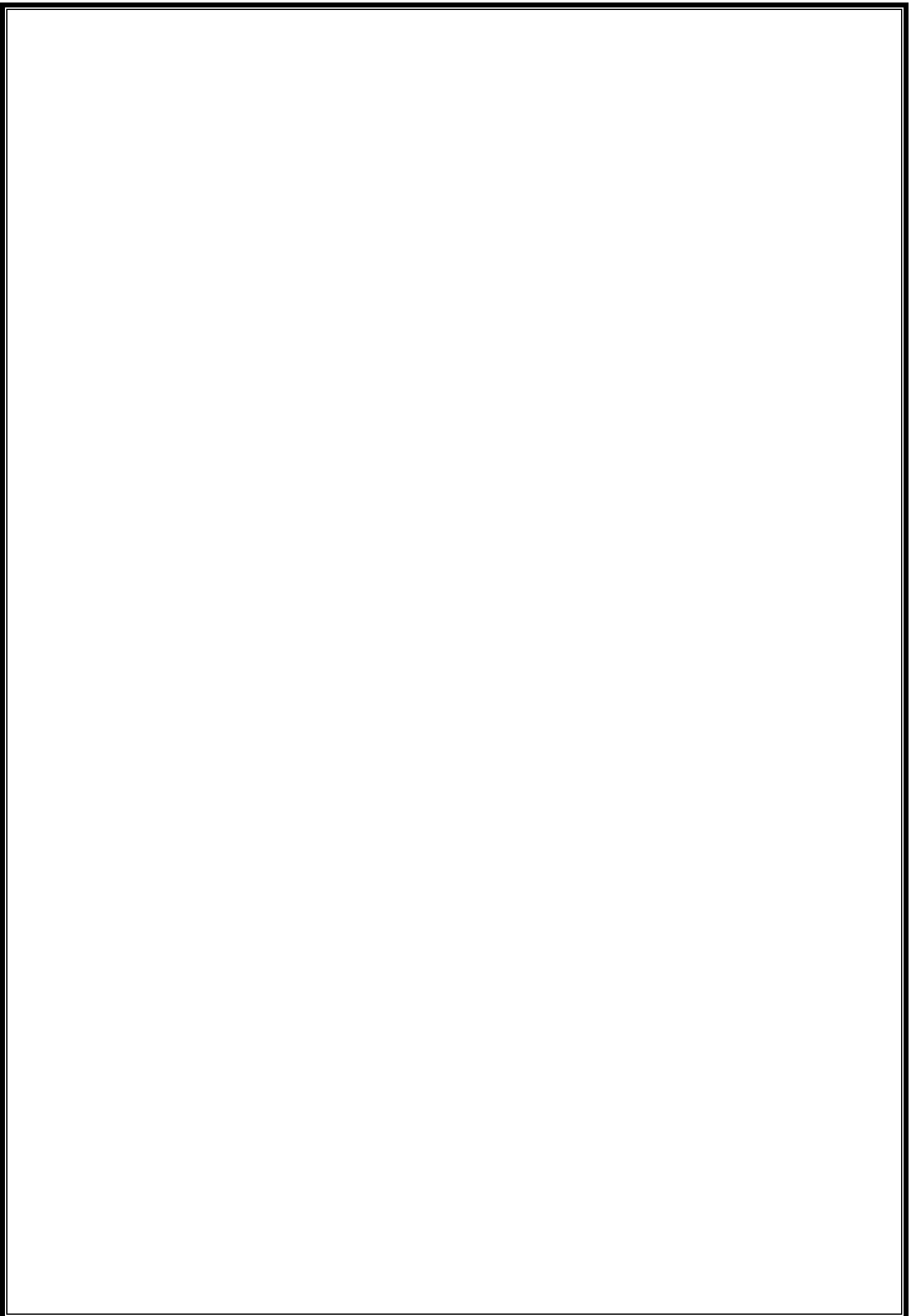
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*Dedicated to
My parents,
My brother,
And my sister*



INTRODUCTION

Ruminants including cattle and buffaloes reared mainly for improving the economy of the country by the production of meat, milk and wool. Meat is not only an essential food but also tasty, easily digested and highly efficient source of animal protein. Moreover; Milk is considered an adequate diet rich with protein, minerals and vitamins. The present lack of protein and milk leads farmers to breed their animals on economic basis to gain the maximum profit in short periods. Ruminants are considered as one of the animals that fulfil their desire. Its meat and milk are needed and its breeding is not so expensive as other hosts (**Metry, 1996**).

Ruminant animals are attacked by various parasites which adversely affect their health. Of these; digenean trematodes are of special interest as they not only causing direct effect but they also indirectly affect the general health condition due to the reduction of growth, loss of weight and lowering the viability. This leads to anemia, emaciation, dehydration and pre-disposing the host to other affections and losses.

Rumen flukes constitute one of these important trematodes of domesticated animals especially cattle, buffaloes and sheep. These worms cause changes in the absorptive surface of the rumen and reticulum that may result in marked alteration in the balance of water, sodium and chlorine ions in the bowel as well as in the morphological and biochemical states of the epithelial cells and its microvilli (**Soulsby, 1982**).

Reviewing the literature showed that the flukes inhabiting the rumen and reticulum result in serious economic losses in wool, meat and milk industries (**Hafez & Rao, 1981, Wariura et al, 1993**). During the migration of the immature flukes, fatal gastroenteritis may occur resulting in high morbidity and mortality. The adult worms located deep by its suckers in the tissue of the rumen and reticulum causing various pathologic lesions (**Varma, 1957**).

Reviewing the available literature showed that several epidemiological studies were conducted in other localities of the world (**Gupta & Singh, 1990; Hafeez & Rao, 1981; Sey, 1991** and others). However, In Egypt surveys were made in provinces other than Behera (**Abdel Ghani, 1961; El Gindy, 1963; Sey & Abdel Rahman, 1974; Sey, 1976; Abd Rabo, 1991; Aly, 1991; El Refaii, 1993; Hasslingar, 1997** and **El Shahawy, 1999**).

Therefore, this study was performed in Behera province (An area with special environmental status different from other localities of Egypt; aiming to study the incidence of rumen flukes infesting cattle and buffaloes and to describe and identify the collected worms. Also some biological studies were made concerning the maturation of the eggs and the pathological effect of these flukes on the affected organs.

REVIEW OF LITERATURE

) Incidence :

(General infestation rate related to age, sex and seasonality)

Paramphistomes infesting ruminant animals represent a great problem specially in young ages. **Willmott and Pester (1955)** found in Britan that the incidence of rumen flukes infesting cattle reached 40 %.

Varma (1957) in India stated that the incidence of *Cotylophoron cotylophorum* among cattle and buffaloes was 48.9 % and 57.1 % respectively.

Also, **Arfaa (1962)** in Khuzistan reported that the incidence among sheep and cows reached 33.3 % and 20 % respectively.

In Iraq; **Kurtpinur and Latif (1970)** mentioned that the incidence in cattle and buffaloes reached 65 % and 40 % respectively.

Later on, **Kotria and Prokopic (1973)** in Cuba found that the prevalence of Paramphistomes in cattle was 25 %.

Garries (1975) recorded in Bangaladish that 64 % of the investigated cattle were infected with rumen flukes.

Sey (1976) in Egypt found that buffaloes were infested with *Paramphistomum microbothrium* and *Carmyerius gregarius* and showed prevalence of 78 % and 25 % respectively.

Kamburov (1977) in Bulgaria found that the highest infection was reported in Summer time, Autumn and at the beginning of Winter.

In (1979) **Lankoster et al** stated that the incidence of *Paramphistomum cervi* among ruminants reached 82 %.

Georgiev et al (1982) stated that the highest incidence of infestation was met with in animals examined during the Summer and Autumn seasons.

In (1984) **Deryto** in Poland found that the incidence of infection with Paramphistomes was 3.03 % and he added that the highest rate of infection was recorded in February (6.36 %) and the lowest rate was in July (1.46 %).

Chinchilla et al (1987) in Venezuela found that the prevalence of rumen flukes infesting cattle was as low as 4.5 %. In the same year; **Razali et al** in Malaysia found 36% of the examined dairy cattle to be infested with Paramphistomes. They added that the age of the investigated cattle showed a relationship where adult cattle were more affected than calves.

Kang and Kim (1988) reported that during their study on the rumen flukes in slaughtered cattle in Korea; females were more infected than males. In the same year, **Coskun** found that the incidence among cattle reached 60.8 %. The peak was in the period between January and May. Also, in the same year **Katagambe et al** found in Rwanda that the incidence in cattle reached 15 %.

Asanji (1989) in Serraleon studied the seasonality; He found that the prevalence of infection was high during the dry and the rainy seasons. He added that the general infection rate was as high among infested cattle as 81.9 %. In the same year, **Kormanova** in Czechoslovakia found that the prevalence was 19.2 %. Also, **Varma et al (1989)** in Bairelly found that the general infection rate with Paramphistomes was 32.18 %.

Gupta and Singh (1990) studied the monthly incidence of Paramphistomes infesting buffaloes and showed that it was higher in August, September and October.

In (1991); **Abd Rabo** in Kafr El Sheikh Province, Egypt carried out a survey on Paramphistomes among cattle and buffaloes. He found that the infection rates were 33.1 % and 17.6 % respectively. He added that the seasonal prevalence during the Spring, Summer, Autumn and Winter was 27.9, 18.3, 15.7 and 30 % in cattle and 22.8, 12, 11.3 and 23.9 % in buffaloes.

In (1993) **El Refaii** in Ismailia province, Egypt found that the incidence was 43.8 % among cattle, but it was as low to reach only 9 % among examined buffaloes. In the same year, Also in El Dakahlia province, Egypt; **Aly (1993)** found that the infection rate with the rumen flukes infesting cattle and buffaloes examined coprologically was 18.82 and 12.64 % respectively. Concerning the seasonality, he recorded that the incidence of infection among cattle was high during winter (34.37%), less so during Autumn and Summer (18.18 and 16.12 %) and was as low as 14.58 % during the Spring season. Also, examination of buffaloes showed that the highest rate was during Autumn and Winter (18.42 and 13.09 %) and it was only 8.82 and 7.46 % during the Summer and Spring seasons. In Kenya; **Waruira et al (1993)** found that the prevalence of infection among young cattle reached 25.6 %.

Paramphistomes infesting ruminant animals represent a great problem specially in young ages. Moreover, these may be the cause of decrease production of cattle (**Rolfe et al; 1994**). Their prevalence has been assessed in most European countries and in Egypt.

Hasslinger et al (1997) in the surrounding region of Kafr El Sheikh Province, Egypt; reported that Paramphistomes were recorded infesting cattle and buffaloes. The prevalence of infection in animals examined at Kafr El Sheikh and Giza provinces to be 34.7 and 24.9 %. They added that the infection rate among cattle and buffaloes in the area of Kafr El Sheikh reached 62.2 and 66.7 % during Spring but only 21.7 and 44 % during Summer. Cattle and buffaloes examined at Giza province showed infestation rates 4.7 and 3.5 % during Summer respectively.

El Shahawy (1999) in Kafr El Sheikh Province found that the incidence of Paramphistomes among slaughtered cattle and buffaloes was 24.7 % and 17.4 % respectively. He also stated that the infestation rate was high in Summer (20.7 %) followed by Spring (20.5 %), Autumn (19 %) and Winter (16.7 %).

Patel et al (2001) found in India that the incidence of Paramphistomes was high and that the infection was reported in all age groups with variations. They added that generally with the increase in age, the infection level decreased. The lower age groups in animals found to be more infected.

Later on, in (2003) **Rangel - Ruiz et al** in India studied the seasonality and stated that their studies showed decrease in the incidence during Winter and Summer seasons.

Also, **Tariq et al (2008)** in Australia found that the prevalence of infection with the rumen flukes decreased in Spring and Summer and increased in Autumn and Winter seasons.

) **Morphology and prevalence of the different detected paramphistomides:**

First of all **Looss (1896)** established the occurrence of *Amphistomum conicum* Rud. 1809 as to be *Paramphistomum cervi* Zedes, 1790. Later on; in 1912 **Looss** identified these worms to be *Paramphistomum microbothrium*, Fiscoeder; 1901.

In 1936, **Ben Dawes** described *Paramphistomum cervi* to be 5 – 11 mm long where the testes were lobulated, tandem in position and the acetabulum was one fourth the total length of the body. He also described *Paramphistomum cotylophorum* to reach 6 mm, where the oral sucker was 0.8 - 1 mm X 0.6 - 0.7 mm. The acetabulum was 1.9 - 2 mm. He also described the genital sucker as a characteristic feature for this worm.

Nasmak (1937) concluded that the collected paramphistomum worms from Egyptian animals were identified as *Paramphistomum microbothrium*.

Swart (1954) found that *Paramphistomum microbothrium* was 7.3 - 9.6 mm. (8.32 mm) long and only 2.8 - 3.9 mm (3.2 mm.) wide. He added that the testes were lobulated, tandem in position and 1.83 mm in length. The acetabulum was 1.9 -2.1 mm (2 mm).

Varma (1957) mentioned that *Cotylophoron cotylophorum* was easily recognized by its purple colour and by the presence of the genital sucker.

Cariro (1960) reported that *Paramphistomum microbothrium* was 10.4 mm and 3.7 mm in length and width respectively, the acetabulum measured 1.8 - 2.2 mm (1.9 mm).

Dinnik (1961) stated that the material examined from slaughtered cattle and sheep from Egypt were identified to be *Paramphistomum microbothrium*.