

STUDIES ON HUMAN FASCIOLIASIS IN EGYPT

1 — SEASONALITY OF TRANSMISSION

By

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ABSTRACT

The present study aimed at investigating the seasonality of human fascioliasis. The monthly distribution of acute infection was studied together with the monthly *Lymnaea cailliaudi* snail density and infection. Infection was observed in both snail and human host throughout the year. However maximal snail infection was observed during the months of June and July while the number of acute human infections peaked in August. It was concluded that summer was the highest transmission season. The clinical incubation period was considered one or two months.

INTRODUCTION

Human fascioliasis in Egypt is an extending problem. Year after year the number of cases presenting to the Department of Parasitology in the Medical Research Institute, Alexandria is increasing (Osman, 1985 and 1991), possibly, a higher potential of transmission with increasing magnitude. Cases presenting for diagnosis are either in the acute or chronic phase of infection. The flow of cases was found to vary in the different months. Accordingly, it was decided to study the seasonality of transmission of human fascioliasis in Egypt.

MATERIALS and METHODS

Patients : The present study included all patients referred for

diagnosis of fascioliasis in the period October 1991 to September 1992. They were referring from the rural areas nearby Alexandria or from within the city. They were subjected to : (1) Clinical examination. (2) Stool specimens were obtained repeatedly and were examined microscopically after the Kato-Katz technique (Katz et al., 1970). (3) Complete blood picture and absolute eosinophilic counts (Dacie and Lewis 1975); IHA (Fumouse kit) were performed to all expected incubating cases.

Lymnaea snail density and infection : Abis II village was the area chosen for snail studies. In a pilot survey, after extensive search, it was observed that *Lymnaea cailliaudi* was the only *Lymnaea* species prevalent in the locality. Determination of species depended on the criteria described by Mandhal-Barth, (1962) and Frandsen & Christensen (1984). Snail habitats were located in canals and drains; 216 stations were fixed for the survey. Monthly all stations were visited and *lymnaea* snails were collected following the standard technique described by Hariston, (1973). In the laboratory the snails were counted and examined for trematodes by two methods :

1. Shedding method : The snails were kept in the cold in refrigerator for one hour, they were then exposed to light. (Hodasi, 1972).

2. Dissection : The snails not shedding cercariae, were crushed gently, the fleshy parts were macerated and *Fasciola* rediae and immature cercariae were identified. (Frandsen and Christensen 1984).

RESULTS

Monthly and seasonal distribution of *Fasciola* cases : A total of 287 patients among those referred for diagnosis of fascioliasis in the period October 1991 to September 1992 were considered positive. Among them 151 were passing eggs and 136 were incubating and diagnosis depending on clinical, haematologic and serologic findings. It was observed that chronic cases presented all over the year without any specific pattern. Acute cases presented during all months except February and March. From April their number gradually increased attaining a peak in August and decreased thereafter. Considering their relative distribution in the four seasons, it was observed that 49% of them presented in summer (June-August) and 30% in autumn.

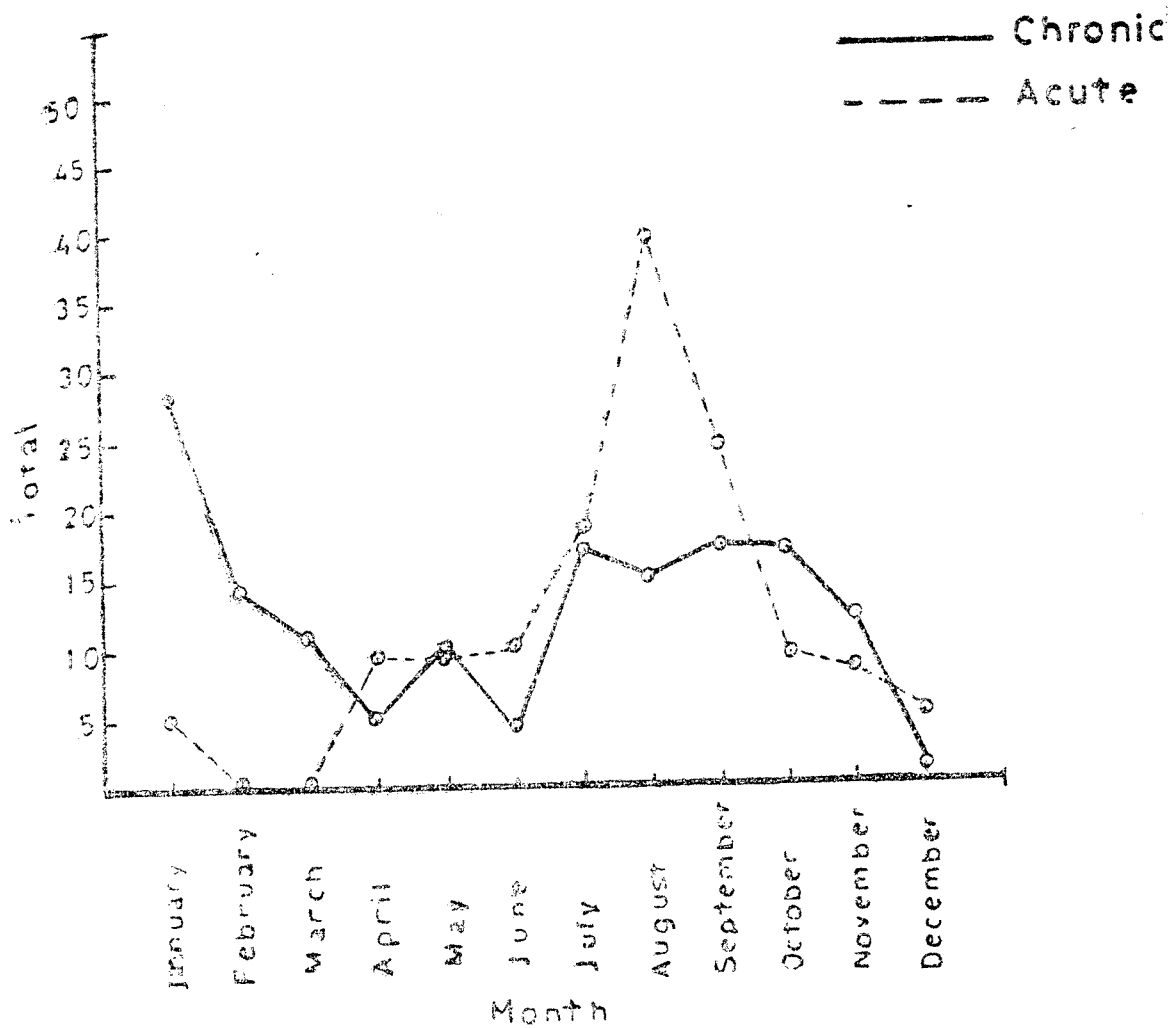


Fig. 1. Monthly distribution of human fascioliasis (October 1991 - September 1992).

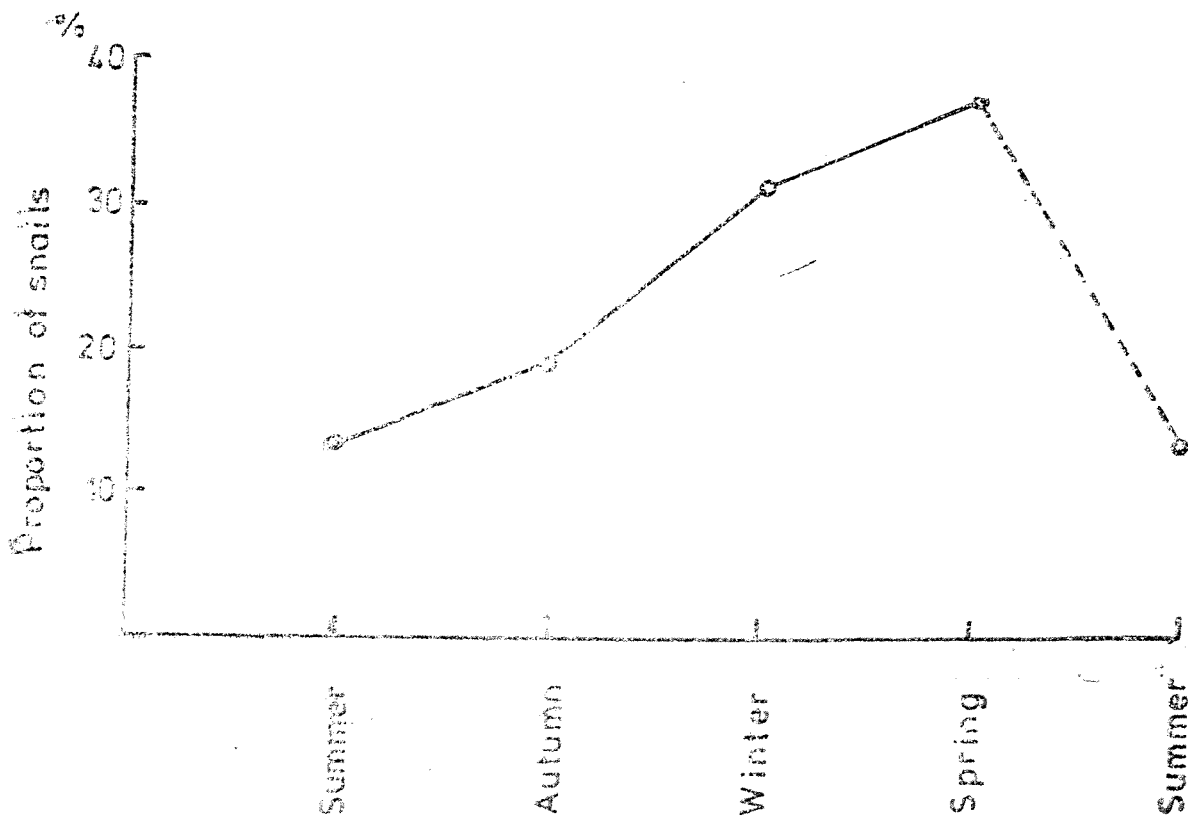


Fig. 3. *F. indicus* snail population by season

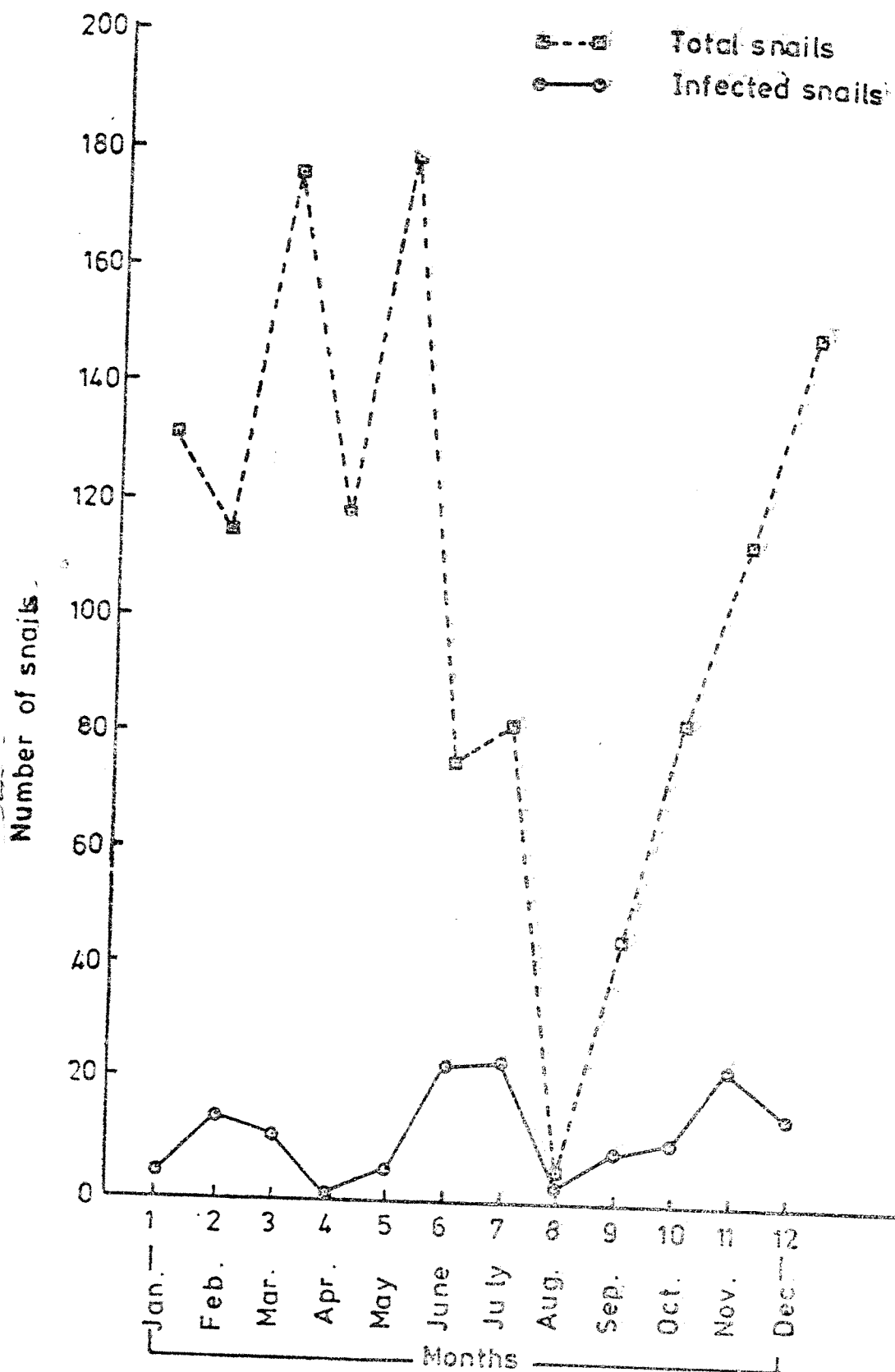


Fig. II Monthly *L. cailliaudi* population density and infection by *Fasciola*.

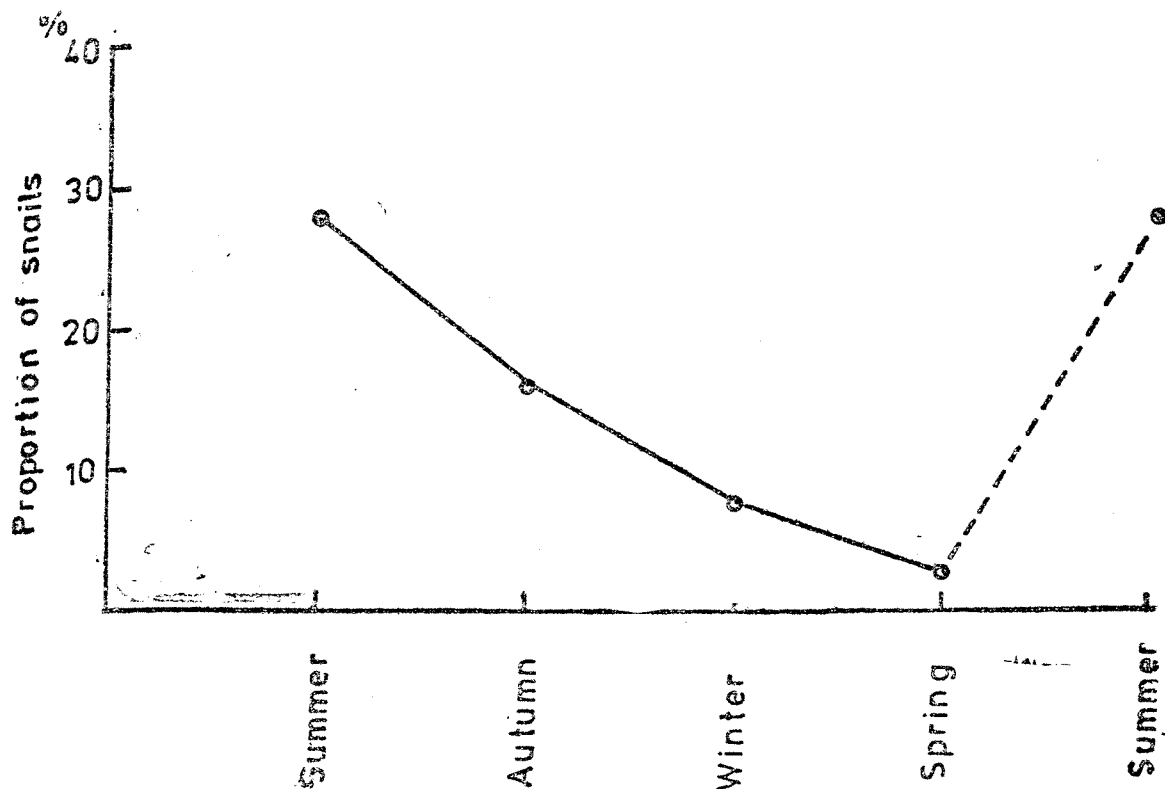


Fig. IV. *L. cailliaudi* snail infection rate by season

TABLE 1. Monthly distribution of human Fascioliasis — October 1991 to September 1992.

| Month | No. of cases | |
|-----------|--------------|---------|
| | Acute | Chronic |
| January | 5 | 28 |
| February | — | 14 |
| March | — | 11 |
| April | 9 | 5 |
| May | 9 | 10 |
| June | 10 | 4 |
| July | 18 | 17 |
| August | 39 | 15 |
| September | 24 | 17 |
| October | 9 | 17 |
| November | 8 | 12 |
| December | 5 | 1 |

TABLE 2. Seasonal distribution of acute cases
October 1991 - September 1992.

| Season | Acute cases | |
|-------------------------------|-------------|-------|
| | Number | (%) |
| Summer (June - August) | 67 | 49.0 |
| Autumn (September - November) | 41 | 30.0 |
| Winter (December - February) | 10 | 7.0 |
| Spring (March - May) | 18 | 13.0 |
| All year | 136 | 100.0 |

TABLE 3. *Lymnaea cailliaudi* snail density and infection by month
in Abis II village.

| Month | No. of snail collected | Fasciola infected snail | |
|----------------|---------------------------|-------------------------|-------|
| | | No. | % |
| January (1991) | 132 | 4 | 3.30 |
| February | 114 | 13 | 11.40 |
| March | 177 | 10 | 5.64 |
| April | 118 | 0 | 0.00 |
| May | 179 | 3 | 1.67 |
| June | 76 | 22 | 28.94 |
| July | 82 | 23 | 28.04 |
| August | 6 | 1 | 16.60 |
| September | 46 | 8 | 17.39 |
| October | 83 | 10 | 12.04 |
| November | 114 | 23 | 20.10 |
| December | 150 | 14 | 9.30 |
| Total | 1277 | 131 | 10.30 |

TABLE 4. Snail population density and infection by season.

| Season | Collected snails | | Infected snail | |
|--------|------------------|-------|----------------|------|
| | No. | % | No. | % |
| Summer | 154 | 12.8 | 46 | 28.0 |
| Autumn | 243 | 19.0 | 41 | 16.0 |
| Winter | 396 | 31.1 | 31 | 7.8 |
| Spring | 474 | 37.1 | 13 | 2.7 |
| Total | 1277 | 100.0 | 131 | 10.3 |

Snail density and infection rate : During one year and from all stations 1277 *Lymnaea cailliaudi* snails were collected and examined. The overall infection rate was 10.3%. In April no infected snails could be detected. In June a large proportion of snails harboured immature parasite stages while in July 28% of snails were shedding cercariae. Considering seasonality, summer represented the lowest snail density and highest infection rate. Details in tables and figures.

DISCUSSION

According to Chen and Mott (1990), the number of clinical cases of *Fasciola hepatica* reported, as well as infected persons identified during epidemiological surveys have been increasing since 1970. This statement applies to Egypt (Osman 1985 and Farag et al., 1988).

The present work was a trial to study the transmission of fascioliasis and to correlate the seasonality of human infection with snail density and infection. In Northern Delta, near Alexandria *L. cailliaudi* was the only snail intermediate host for *Fasciola*. Snail density increased gradually in autumn, winter, spring and fell in summer to reach a minimum in August. It is probable that the higher temperature in summer was deleterious and killed the majority of the snails. This finding is in accord with the observation of Abdel Latif (1985), Abdel Ghani (1960) and Selim et al., (1987) who were working in the vicinity

of Alexandria. Snail infection reached its maximum late in spring and early in summer and dropped thereafter. In Egypt, several workers reported high snail infection rate in summer (Nagaty et al., 1959; Ross 1977 and Heikle and El-Shokkary 1987), however others reported different findings (Abdel Latif 1985). In the present study the high snail infection rate early in summer, in the months of June and July, correlates and explains the high proportion of acute cases that presented in August. The clinical incubation period can thus be considered one or two months. Previous studies in France (Rimbault 1981) reported that the peak incidence of cases diagnosed during an outbreak occurred 2 to 2.5 months after infection. However, the high transmission season in summer should not overshadow the fact that the probability of transmission is continuous throughout the year (Ripert et al., 1988).

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