قسم : الميكروبيولجيا.
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# دور القوارض كحاملات لميكروب السالمونيلا بمنطقة أدفينا

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تم جمع ١٠٠ فأر وجرز من أنواع مختلفه (١٤ فأر منزلي، ٣١ فأر نورويجي، ١٦ فأر مصرى ، ١٣ فأر حقلي ، ٥ فأر قاهرى، ٢١ جرز منزلي) من أماكن مختلفة في منطقة أدفينا وفحصت لوجود ميكروب السالمونيلا وتم عزل عشرون ميكروب من السالمونيلا هما سالمونيلا تيفيميوريم، سالمونيلا دبلبن ، سالمونيلا انترتيدس، سالمونيلا باراتيفى أ سالمونيلا باراتيفى ب وسالمونيلا نيوبورت بنسبة ٦، ٤، ٤، ٢، ٢، ٢٪ على الترتيب . تم مناقشة الأهمية الصحية لكل ميكروب على صحة الانسان والحيوان.

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# ROLE OF RODENTS AS A RESEAVIOR OF SALMONELLA SPECIES AT EDFINA AREA

*(With 3 Tables)*

*By*
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## SUMMARY

One hundred rats and mice of different species (14 Rattus rattus ratus, 31 Rattus norvegicus, 16 Rattus alexandrinus, 13 arvicanthus neloticus, 5 Acomys cahirinus and 21 Mus musculus) were trapped from different localities at Edfina village and examined for the presence of Salmonella organisms.

S.typhimurium, S.dublin, S.enteritidis, S.paratyphi A, S.paratyphi B and S.newport were isolated at a rate of 6,4,4,2,2 and 2% respectively.

The public health important of each strain for both animal and human beings was discussed.

## INTRODUCTION

Rats and mice are harmful reservoirs a variety of a caustive agents of diseases transmissible to man and animals.

The world wide distribution and public health importance of salmonellosis in rodents have attracted the attention of many workers (WELCH, et al. 1968; MOUSTAFA, et al. 1948; ZAHARIJIA, 1960; ROBINSON and DANEIL, 1968; EL-BAHAY, et al. 1971; GHONEIM, 1972; OMAR, 1973 and ABOU-GABAL, et al. 1974). The purpose of the present study is to illustrate the incidence of salmonella apecies which may transmitted to man and animal through these pests.

## MATERIAL and METHODS

### A- Collection of rodents:

A total of 100 rats and mice were trapped from Edfina Village and its surrounding areas. They were identified according to KAMEL (1958) and sacrified. The liver, spleen, kidneys and lungs were aseptically removed and kept separately in sterile containers while the intestinal contents were collected and preserved in the refrigerator till used.

### B- Bacteriological examination:

About 2 gm from each organ were thoroughly suspended in a sterile saline solution. Part of the suspension was cultured in nutrient broth and incubated for 24 hours at 37°C as a pre-enriched medium (HARVEY and PRICE, 1979). 1 ml of each inoculated broth was transferred

into Selenite F broth and incubated at 37°C for 18 hours. A loopfull from each tube was streaked onto MacConkey's and SS agar plates and the inoculated plates were inculated at 37°C for 24 hours.

Suspected colonies were carefully picked up and identified biochemically and serologically according to EDWARDS and EWING (1962) and CRUICKSHANK, et al. (1975).

## *RESULTS*

Collected rodents could be grouped into Rattus rattus rattus, Rattus norvegicus, Rattus alexandrinus, Arvicanthis niloticus, Acomys canhirinus and Mus musculus with the following rates 14, 31, 16, 13, 5 and 21% respectively.

Table (1) illustrates the isolated strains of Salmonella which were identified as S.typhimurium (6%), S.dulin (4%), S.enteritidis (4%), S.paratyphi A, S.paratyphi B and S.newport (2% for each).

Table (2) shows that the intestines and liver were the main sites of isolation of Salmonella speceis.

On the other hand, the incidence percentages of the isolated strains from other organs including spleen, kidneys and lungs were found to be 4, 3 and 1% respectively.

The data presentes in Table (3) reveal the types of Salmonella isolated from each species of rodents. S.typhimurium was isolated from all of examined rodents except Acomys Cahirinus. S.dublin was isolated from Rattus rattus rattus, Rattus norvegicus, Acomys cahirinus and Mus musculus. S.enteritidis was detected from Rattus rattus rattus, Rattus norvegicus, Rattus alexandrinus and Mus musculus. On the other hand, S.paratyphi A and S.paratyphi B were isolated from Mus musculus while S.newport could only be detected in Rattus norvegicus.

## *DISCUSSION*

The results presented in Table (1) reveal that 20 Salmonella strains could be isolated from 100 rats and mice constituting an incidence of 20%. These results are nearly similar to those reported by ABOU-GABAL, et al. (1971) but lower than that obtained by BOJARSKI (1961) and EL-BAHAY, et al. (1971) and higher than those cited by GHONEIM (1972). These variations may be due to changes in climatic conditions prevailing among places from which these pests were trapped.

S.typhimurium was the most prevalent species (6%) isolated from all trapped rodents except Acomys cahirinus (Table 3). These rodents especially Rattus rattus rattus cause great losses to cereals and seeds by consuming it with subsequent contamination by their droppings. This strain is responsible for food poisoning in man (CRUICKSHANK, et al. 1975).

S.enteritidis was isolated at an incidence of 4% (Table 1) which is lower than that found by EL-BAHAY, et al. (1971) and ABOU-GABAL, et al. (1974) while higher than those obtained by GHONEIM (1972). S.enteritidis was isolated from all examined rodents except Arvicanthis niloticus and Acomys Cahirinus (Table 3). Moreover, rats and mice may live in very close contact with human structures and animals enclosures contaminating their food (HOGSTRAAL, 1963). Similarly S.dublin was isolated at an incidence of 4% (Table 1). This strain was previousely

isolated from rats by ZAHARIJIA (1960) and BOJARSKI (1961) however, it has been found that Rattus alexandrinus and Arvicanthos niloticus play no role in the epidemiology of this strain of salmonella (Table 3).

**Table (1)**
**Incidence of Salmonella species isolated from redents**

| Salmonella | Antigenic structure | | | Frequency | % |
|---|---|---|---|---|---|
| | O antigen | H antigen | | | |
| | | Phase 1 | Phase 2 | | |
| S. typhimurium | 1, 4 (5), 12 | i | 1,2 | 6 | 6 |
| S. dublin | 1, 9, 12 | g,p | - | 4 | 4 |
| S. enteritidis | 1, 9, 12 | g,m | - | 4 | 4 |
| S. paratyphi A | 1, 2, 12 | a | - | 2 | 2 |
| S. paratyphi B | 1, 4 (5), 12 | b | 1,2 | 2 | 2 |
| S. newport | 6, 8 | e,h | 1,2 | 2 | 2 |
| Total | | | | 20 | 20 |

S. paratyphi A and S. paratyphi B, the causative agents of paratyphoid fever in man (TOPLEY and WILSON, 1975) were only isolated from Mus musculus. The isolation of these two strains from the house mouse is of particular significance since they live in close contact with man and contaminate his food and beverages.

Two strains of S. newport were recovered from Rattus rattus rattus (Table 3). KHALIL (1938) could also isolate this strain from wild rats in Egypt. In addition, BALIZARD (1966) found that this rat lives near vicinity of human dwellings, animal houses, drains, sewers and garbage dumps with a consquent role in transmitting various infections.

The presence of rodents constitute a complex economic and public health problems. Regarding the economic point of view, they cause great losses including knawing of foundation, deterioration of cereals and devouring of food stuffs. On the other hand, the public health importance include their role as carriers of S.paratyphi A and S.paratyphi B (the causetive agents of paratyphoid fever in man) and S.typhimurium, S.dublin, S.enteritidis and S.newport, responsible for cases of food poisoning in humanbeings (TOPLEY and WILSON, 1975).

From the abovementioned results, rat proofing measures in human and animal buildings and the maintenance of sanitary measures together with the mechanical, chemical and biological destruction of rodents are essential.

**Table (2)**
**The distribution of Salmonella species isolated from various organs of rodents**

| Salmonella species | Intestine | Kidney | ORGANS | | | Total |
|---|---|---|---|---|---|---|
| | | | Spleen | Liver | Lung | |
| S. typhimurium | 2 | 1 | 1 | 2 | - | 6 |
| S. dublin | 1 | 1 | - | 2 | - | 4 |
| S. enteritidis | 2 | - | 1 | 1 | - | 4 |
| S. paratyphi A | - | 1 | - | 1 | - | 2 |
| S. paratyphi B | 1 | - | 1 | - | - | 2 |
| S. newport | - | - | 1 | - | 1 | 2 |

**Table (3)**
**Salmonella species isolated from different species of Rats and Mice**

| Type of rodents | No. of examined rodents | Salmonella species | | | | | | Total % |
|---|---|---|---|---|---|---|---|---|
| | | S.typhimurium | S.dublin | S.entertidis | S.paratyphi A | S.paratyphi B | S.newport | |
| R R R | 14 | 2 | 1 | 1 | - | - | - | 4 |
| R R N | 31 | 1 | 1 | 1 | - | - | 2 | 5 |
| R R A | 16 | 1 | - | 1 | - | - | - | 2 |
| A N | 13 | 1 | - | - | - | - | - | 1 |
| A C | 5 | - | 1 | - | - | - | - | 1 |
| M m | 21 | 1 | 1 | 1 | 2 | 2 | - | 7 |
| Total | 100 | 6 | 4 | 4 | 2 | 2 | 2 | 20 |

R R R: Rattus rattus rattus  A N: Arvicanthus niloticus
R R N: Rattus norvegicus  A C: Acomys Cahirinus
R R A: Rattus rattus alexandinus  M m: Mus nusculus

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