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# STATEMENT ON CURRENT RESEARCH ON RODENTS AND RODENTICIDES IN EGYPT

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It is a well-known fact that rodents play an important role in disease transmission and as pests of economic importance. The impact is rather more important in developing countries. Hence the need for scientific research on rodents, their economic and public health importance, delineation of highly infested areas and appropriate methods of control.

In Egypt, research has been mostly fragmentary, until a few years ago when some Egyptian workers in the Research Institute of Medical Entomology and other Research Centres in the Universities and Ministry of Agriculture probed deeply in this problem.

Not only this, but many theses in progress now in the universities are devoted to the study of these problems. Studies in the Research Institute of Medical Entomology, M.P.H. covered several aspects such as the geographical distribution of rodents in Egypt, their ectoparasites and their endoparasites. In addition other biological, ecological and toxicological studies were undertaken.

Attached as annex I is a long list of some of the researches which have been collected.

I. Geographical distribution:

- Rattus norvegicus exists almost all over the country, the highest index being at the Port-Said area. However it was completely absent from the coastal area of Sinai and the oases.
- Mus musculus was mainly coastal in distribution.
- Acomys cahirinus was absent from the coastal area, but reached its maximum density at Beni-Swif.
- Rattus rattus almost reciprocal with A. cahirinus.

- Spring (March - May) is the season of maximum reproduction of Rattus norvegicus, and autumn is the season of higher density.

II. Ectoparasites: 1- Fleas:

- Fleas are the main ectoparasite followed by mites, lice and bed-bug.
- Xenopsylla cheopis shows high densities in Upper Egypt and oases.
- Ctenocephalidis felis recovered from all rodent except Mus musculus which was not detected in oases. Parapulex chephrenis parasitized on A. cahirinus and M. musculus in Upper Egypt and Nile Delta.

Echidnophaga gallinacea is restricted to Rattus norvegicus and Mus musculus in the coastal zone and Northern part of Upper Egypt. Leptopsylla segnis on Rattus rattus and Mus musculus: it is confined to the Nile Delta. Pulex irritans was recovered from Rattus norvegicus and Acomys cahirinus in the Nile Delta and Upper Egypt.

2- Lice:

Polyplax spinulosa is recovered from all rodents, P. oxyrrhyncha is recovered from A. cahirinus and Haploplewn capitosa from Rattus norvegicus and Acomys cahirinus.

3- Mites:

Show highest rate of infestation in the Coastal Zone.

- The infestation percentage on immature host was higher than on mature; the density of infestation and gravid percentage were higher on the latter.

III. Endoparasites:

1- Helminths:

The genera found on rodents are: Hymenolepis diminuta, H. nana, Fraterna, Raillietina spp., Heterophyes, heterophyes, Echinochasmus spp., Prohemistomum sp., Syphacia obvelata and Moniliformis *moniliformis*.

This species has been known to be of medical importance.

| The host | Vulnerability to various helminth groups. |
|---|---|
| R. norvegicus | Cestodes, Nematodes, Tremetodes and Acanthocephala. |
| R. rattus | Cestodes, Nematodes, Acanthocephala and Trematodes. |
| Mus musculus | Cestodes and Nematodes. |
| Acomys cahirinus | Nematodes, Cestodes and Acanthocephala. |

- New host record or distribution:

| Helminths | Host |
|---|---|
| Trematodes | |
| H. heterophyes | Rattus norvegicus |
| H. aqualis | Rattus norvegicus |
| Echinochasmus sp. | Rattus norvegicus, Rattus rattus |
| Prochemistomum sp. | Rattus norvegicus. |
| Limatulum sp. | Rattus norvegicus. |
| Cestodes | |
| Inermicapsifer sp. | Rattus rattus. |
| Catenotaenia sp. | Mus musculus. |

| Helminths | Host |
|---|---|
| Nematodes | |
| Heterakis spumosa | Rattus norvegicus, Acomys cahirinus |
| Mazzio sp. | Rattus rattus. |
| Conylonema neoplasticum | Rattus norvegicus, Rattus rattus. |
| C. muscule | Mus musculus. |
| Strongyloides ratti | Rattus norvegicus, Rattus rattus. |

2- Protozoan: - R. norvegicus as reservoir of Toxoplasma infection : high titres are higher among male rats, which rise with age of the host; pregnant females showed only mild reactors (By seriological examination with Sabin Feldman test).

- The overall infection rate with Trypanosoma among total rodents amounted to 15.0% with Anaplasma to 7.1% with Hepatozoon to 1.9% with Haemobartonella to 0.33% with Grahamella to 0.08% and with spirochaetes (Borrelea) to 0.25%, whereas Eperythrozoon was detected only once in a single Rattus r. frugivorus from Alexandria area.

- Trypanosoma lewisi recovered from Rattus norvegicus and Rattus rattus.
- T. duttoni recovered from Mus musculus, and T. acomys recovered from A. cahirinus.

IV. Toxicological studies:

- In the villages control by Warfarine was not possible; to determine the period of application a village-wide application might be recommended. Continuous baiting in towns, old houses, as well as in factory buildings in the desert appeared to be indispensable.

- Warfarine was found more successful against Rattus spp. In localities with mixed infestation with Acomys sp. and Rattus sp., it seems more profitable to initiate control with Crimidine and to maintain it with Warfarine, in order to attain full success and to minimize the possibility of the development of resistance against Warfarine.

- The effect of Crimidine was more noticeable against A. cahirinus than A. Dimidiatus. It has been found highly effective against Mus musculus but not against R. norvegicus. The average minimum lethal dose per gram/body weight was estimated on the bases that each wheat grain is coated with 0.1% Crimidine which contained on average 0.037 mg. of Crimidine. The minimal lethal dose decreases with increasing weight of Acomys cahirinus. In young mice, males proved more susceptible to the poison than females and vice versa in older mice.
  Crimidine is an effective against A. cahirinus provided that about 4 to 5 grains are initially consumed.

- Trapping has equal effect on both adults and young R. norvegicus whereas it seems more effective against the young of the remaining species.

- Arvecanthis niloticus was controlled by deep ploughing and destroying inner field boundaries after harvest before they get hard. Shelters in deserted areas with tall dense weeds, water canals should be removed. The garbage dumped should be compacted and covered with earth every day. A. niloticus was controlled by using blocks containing 0.05% Tomarin (Ratelan) in burnt clay tubes 10 cm. in diameter and 50 cm. in length and Zinc phosphide 2.5% in wet bait or 5% in dry bait.

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