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Full Length Research Paper

# Pest Species Associated at Farm Animals in Assiut University, Egypt

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This study aims to survey the farm animal pests, in addition to the farm animal ectoparasites and survey the rodent species and their ectoparasites, the pests of the animal manure were estimated also. The rodent species were surveyed by trapping in the animal farm, Assiut University during 2007-2010 recorded species were the white belled rat, *Rattus rattus frugivorus* represented by 52.86%, the grey bellied rat *Rattus rattus alexandrinus* 28.74% and the Nile grass rat *Arivcanthis niloticus* 18.4%. Adult stages of flies found in animal production farm were *Musca domestica*, *Muscina conicularis*, *Stomoxys calcitrans*, *Tubana* sp, *Sarcophaga* sp, and *Phormia regina* in addition to a single of mosquitoes, *Culex* sp. The animal body surfaces were suffered with infestation of certain pests (i.e., lice on buffalo's fleas on sheep and ticks on cattle body surfaces). In soil of the husbandry animals, the recorded ectoparasites were *Amblyomma* sp, *Haemophysalis* sp, *Pullex irritans* and *Xenopsylla cheopis* from cattle sheds and *Sarcoptes* sp., the oriental flea *Xenopsyllae cheopis* and *Sarcoptes* sp., from sheep-sheds. Four species of mites were: *Amerosieus* sp., *Hypoaspis smithii*, *Glycyphagus* sp., and *Tarsonemus* sp., one species of hard tick, *Haemaphysalis* sp., a single species of fleas, *Xenopsylla cheopis* and a single species of lice, *polyplax spinulosa* were deduced from rodent burrows. While on rodent species body surface. Eight species of mites; three species of fleas and two species of lice, collected from the body surface of certain rodent species.

**Keywords:** Ectoparasites, Rodent species, Mite species, *Sarcoptes*, Hard ticks, Animal manure.

## INTRODUCTION

Ruminants as cattle, sheep and goats are worldwide important (Schnieder, 2008). Many of these ectoparasites species have their breeding sites very close to their hosts, so that they are practically always present.

Many ectoparasites harm the health or their hosts by blood sucking (e.g. ticks, mite, biting, flies, fleas, lice and bugs). This leads to primarily often enormous losses of blood. In addition to some of the blood-sucking ectoparasites may be act as vectors of some diseases,

such as ticks may transmit stages of Babesia, Theileria, Rickettsiales, Several bacteria and viruses (Raether and Harder, 2008).

Blood-sucking insect such as biting flies, of diseases as midges turned out as vectors of bluetongue virus (Mehlhorn et al., 2010), (Conraths et al., 2007), (Dettner and Peters, 2010).

The economic impact from changes in animal husbandry and the need for increased the parasite

**Table 1.** Survey of the rodent species in farm animals of the Faculty of Agriculture, Assiut University, during 2007-2010.

Species	<i>R. r. frugivorus</i>	<i>R. r. alexandrinus</i>	<i>A. niloticus</i>
Years	%	%	%
2007-2008	67.71	26.04	6.25
2008-2009	56.40	30.05	13.55
2009-2010	30.95	30.69	38.36
Grand mean	52.86	28.74	18.40

**Table 2.** Survey of insect species in farm animals of the Faculty of Agriculture, Assiut University, during, 2008-2010

Animal farm Species	Buffalo	Cattle	Sheep farm
<i>Musca domestica</i>	+++	+++	+++
<i>Muscina canicularis</i>	++	++	+
<i>Tabania sp.</i>	++	-	-
<i>Stomoxys calcitrans</i>	+	+	-
<i>Sarcophaga sp.</i>	+	+	-
<i>Phormia regina</i>	+	+	-
<i>Culex sp.</i>	+	+	++

+++ = Heavily infested animals with insects, > 100

++ = Moderately infested animals with insects, < 50

+ = Slightly infested animals with insects, < 20

- = None infested animals

**Table 3.** Survey of ectoparasites in farm animals of the Faculty of Agriculture, Assiut University, during, 2008-2010

Farm animal Arthropods	Buffalo	Cattle	Sheep farm
Lice	+++	-	-
Fleas	-	+	+++
Mites	+	-	+
Ticks	-	++	-

+++ = Heavily infested animals with insects, > 100

++ = Moderately infested animals with insects, < 50

+ = Slightly infested animals with insects, < 20

- = None infested animals

surveillance and control have increased the need for a better understanding of current distribution and prevalence of livestock and domesticated animal ectoparasites.

The present work of investigations aims to study the pests of animal farms and the ectoparasites of the animal body surface.

## MATERIAL AND METHODS

Present study was conducted in the farm animals of

faculty of agriculture, Assiut University, this farm about five Faddens, including the buildings of animal sheds and animal food storages. This farm contains buffalos, cattle and sheep. The present work aimed to survey the pests in the farm included both ectoparasites associated with animals and rodent species in addition to the pests collected from animal manure and the pests in the ground of the farm.

### 1 – Rodents:

Twenty wire-box traps were baited and distributed twice every week at 6 pm and collected at 7 am. The captured rodents were classified and recorded. The percentage of

**Table 4.** Survey of arthropods in animal-sheds of the Faculty of Agriculture, Assiut University, during, 2008-2010

Arthropods	Lice	Fleas	Mites	Ticks
Animal sheds				
Rodent burrows	<i>Polyplax spinulosa</i>	<i>Xenopsyllae cheopis</i> <i>pulex irritans</i>	<i>Amerosieus sp.</i> <i>Hypoaspis smithii</i> <i>Glycyphagus sp.</i> <i>Tarsonemus sp.</i>	<i>Haemophysalis sp.</i>
Cattle sheds	-----	<i>Xenopsyllae cheopis</i> <i>pulex irritans</i>	-----	<i>Amblyomma sp.</i> <i>Haemophysalis sp.</i>
Sheep sheds	-----	<i>Xenopsyllae cheopis</i>	<i>Sarcoptes sp.</i>	-----

**Table 5.** Survey of the rodent ectoparasites in farm animals of the Faculty of Agriculture, Assiut University, during 2007-2010.

Rodents	<i>R. r. frugivorus</i>	<i>R. r. alexandrinus</i>	<i>A. niloticus</i>
Ectoparasites			
Lice	<i>Polyplax spinulosa</i> -----	<i>Polyplax spinulosa</i> <i>Haplopleura oenonydis</i>	<i>Polyplax spinulosa</i> -----
Fleas	<i>Xenopsyllae cheopis</i> <i>Leptopsylla segnis</i> -----	<i>Xenopsyllae cheopis</i> <i>Leptopsylla segnis</i> <i>Pullex irritans</i>	<i>Leptopsylla segnis</i> ----- -----
Mites	Mesostigmata		
	<i>Ameroseiidae</i> <i>Amerosieus sp.</i>	-----	<i>Ameroseiidae</i> <i>Amerosieus sp.</i>
	<i>Dermanyssidae</i> <i>Ornithonyssus bacoti</i>	<i>Dermanyssidae</i> <i>Ornithonyssus bacoti</i>	-----
	-----	<i>Laelapidae</i> <i>Hypoaspis smithii</i>	<i>Laelapidae</i> <i>Hypoaspis smithii</i>
	Astigmata		
	<i>Acaridae</i> <i>Rhizoglyphus echinopus</i>	<i>Acaridae</i> <i>Rhizoglyphus echinopus</i>	-----
	<i>Glycyphagidae</i> <i>Glycyphagus sp.</i>	<i>Glycyphagidae</i> <i>Glycyphagus sp.</i>	<i>Glycyphagidae</i> <i>Glycyphagus sp.</i>
	<i>Listrophoridae</i> <i>Myocoptes sp.</i>	<i>Listrophoridae</i> <i>Myocoptes sp.</i>	-----
	Prostigmata		
	<i>Cheyletidae</i> <i>Cheyletus zaheri</i>	-----	-----
<i>Tarsonemidae</i> <i>Tarsonemus sp.</i>	<i>Tarsonemidae</i> <i>Tarsonemus sp.</i>	<i>Tarsonemidae</i> <i>Tarsonemus sp.</i>	
Ticks	-----	<i>Loxodidae</i> <i>Amblyomma sp.</i>	-----
	<i>Haemophysalis sp.</i>	-----	<i>Haemophysalis sp.</i>

each species was estimated during the survey period.

2 – Flies:

Flies were collected by using a sweeping net (handle, 80cm long, hoop 28cm. in diameter, Egyptian white cloth

bag (80 cm. depths). Samples were taken twice each week through fly activity inside and outside door. Flies were anaesthetized by chloroform and transferred to laboratory for identification.

3 – Mosquitoes:

A 100-150 ml of water was taken weekly at a depth of 10 cm. of the pool, and put in plastic containers, then transferred to the laboratory for identification.

4 – Animal ectoparasites:

Samples were taken once weekly from five regions of the animal body chosen to the study. Samples were individually anaesthetized in a jar containing a cotton pad moistened with chloroform, then brushed in a deep white plate using a relatively hard brush. Collected ectoparasites were preserved in plastic tubes containing 70% ethyl alcohol and labeled with necessary information for identification.

5 – Animal manure pests:

Samples were taken ten times each month during two successive seasons, 2008 to 2010 from soil of rodent burrows, cattle and sheep at experimental farm of Assiut University. Soil samples were preserved in plastic bags labeled with identification. Extraction was carried out using the modified Berlese's extractor apparatus. After extraction of the whole fauna in the samples, arthropods were isolated in small vials then counted by using a stereoscopic binocular microscope. Clearing of collected specimen was done using lactic acid and higher technique was used for mounting of mites. Mites were mounted and left to dry by using a hot plate and prepared of microscopic examination. Identification of mites and ticks was done using different keys constructed by (Zaher, 1986).

6 – Ectoparasites associated rodents in animal farm:

Rodents were collected alive and classified to species and subspecies, male and female of each as well as the distribution frequency of each species (%) was estimated. For collection of ectoparasites, rodents were individually anaesthetized in a jar containing a cotton pad moistened with chloroform then brushed in a deep white plate using a relatively hard brush. After collecting the ectoparasites, they were preserved in plastic tubes containing 70% ethyl alcohol and labeled with necessary information. The ectoparasites were classified as fleas, lice, mites, and ticks.

## RESULT AND DISCUSSION

Data in table (1) show the species of rodent trapped from farm animal of Assiut University during the period from 2007 to 2010 years. The white bellied rat, *R. r. frugivorus*. The grey bellied rat, *R. r. alexandrines*, and the Nile grass rat, *A. niloticus*.

*R. r. frugivorus* was recorded the highest dominant percentage (67.71% and 56.40%) followed by *R. r. alexandrines* (26.04% and 30.05%) and *A. niloticus* was (6.25% and 13.55%) during the first and second years, respectively. This may be due to the presence of more preferable trees for nesting and feeding. In the third year *A. niloticus* occupied the highest dominant percentage

(38.36%) followed by *R. r. frugivorus* (30.95%) and *R. r. alexandrines* (30.69%). This may be due to the availability of food in neighbored field crops and vegetable plantations in faculty farm. (Embarak, 1997) recorded three species of rodent in the cultivated area in Assiut Governorate, *R.r. frugivorus* (45.05%), *A. niloticus* (31.71%) and *R. r. alexandrines* (26.24%) and in a semi-arid area, *R.r. frugivorus* represented (46.51%). While, *R. r. alexandrines* was not encountered.

Generally, the data represent three dominant species of rodents, the white bellied rat, *R.r. frugivorus* that represented 52.86% of population followed by the grey bellied rat, *R. r. alexandrines* that represented 28.74% and *A. niloticus* that represented 18.40%. the white bellied rat was the most dominant species in the faculty farm in the first and second years, and that may be due to several factors e.g. intra-specific competition, fecundity increasing and inhabitant the ecosystem in which poultry buildings of the animal production farm, or presence of palm trees poultry farm nearby and this provides shelter and also to an increase in feed stores.

Data in table (2) show that six species of flies and one species of mosquito were recorded in farm animal of Assiut University during 2008 – 2010. Biting and non biting species of the recorded flies were belonging to four families during the course of the present work. These species were identified as follows:

1 – Family: Muscidae

*Musca domestica* Macq

*Muscina canicularis* Wied

*Stomoxys calcitrans* L.

2 – Family: Tabanidae

*Tabania* sp Merg.

3 – Family: Sarcophagidae

*Sarcophaga* sp. L.

2 – Family: Calliphoridae

*Phormia regina* Meig.

The house fly, *M. domestica* Macq was collected from the farm animal in high numbers during the two years as compared with the other species. The stable, *Tabania* sp. was recorded only in buffalo sheds, but the billing fly had never recorded in sheep farm, *S. calcitrans* was collected with considerable numbers from the buffaloes and cattle farms. *Sarcophaga* sp. and *P. regina* were recorded in comparatively low numbers through the two years in the area of study. These results may be due to the presence of organic matter in animal production farm, results were in agreement with those obtained by (Abo et al., 1998), (Alahmed, 1998).

Data in the same table (2) also showed that a single species of mosquito (*Culex* sp.) was recorded in animal farm during 2008 – 2010 at Assiut University. Similar result was obtained by (Abo et al., 1998), (Alahmed, 1998).

Data in table (3) showed that the farm animals were infested by lice, fleas, mites, and ticks during the period of study. Lice (*Haematopinus tuberculatus* L) were highly

recorded in buffalo farm, but absence on cattle and sheep. The fleas were collected with high members from sheep farm and scarce from cattle, but absent in buffaloes farm. Buffaloes and sheep farms were slightly infested with mites, while no mites were found on cattle farm. Cattle were moderately infested with ticks. While mites were completely absent in the other two farms. These results were recorded also by (Bazarsonga et al., 2007), (Tefera and Bebe, 2007), (Muhammad et al., 2008), (Davoudi et al., 2008), (Karkar et al., 2009), (Taswar et al., 2008) in the farm animal.

Data in table (4) showed that the ectoparasites species collected from the soil of rodent burrows from the farm of the Faculty of Agriculture. The collected mite species were *Amerositeus* sp., *Hypoaspis smithii*, *Glycyphyalis* sp. And *Tarsonemus* sp., and one species of hard tick, *Haemophysalis* sp., from the family Ixodidae, the single species of fleas (*Xenopsylla cheopis*) and a single species of lice (*Polyplax spinulosa*) were also collected from cattle-sheds, while *Sarcoptes* sp., and *Xenopsylla cheopis* were collected from sheep-sheds. (El-Eraky et al., 1993) recorded 28 species of mesostigmata representing 9 families and 18 genera in the farm animal of the faculty of agriculture (Assiut, Upper Egypt). Results also revealed the relationship between the parasite mites on rodent and mites on animals. This phenomenon may explain the fact that rodents play an important role as a host and a mediator in the animal production farm is recommended.

Data in table (5) revealed the presence of some ectoparasites collected from rodent species in the farm of the faculty of Agricultural. The collected parasites were: eight species of mites (*Amerositeus* sp., *Hypoaspis smithii*, *Ornithonyssus bacoti*, *Rhizoglyphus echinopus*, *Glycyphagus* sp., *Myocoptes* sp., *Tarsonemus* sp., and *Cheyletys zaheri*) belonging to eight families of mites. Two species of hard ticks were also found (*Amblyomma* sp., and *Haemaphysalis* sp.) pertaining to the family Ixodidae. Three species of fleas (*Xenopsylla cheopis*, *Leptopsylla segnis*, *Pulex irritans*) and two species of lice (*Polyplax spinulosa*, *Haplopleura oenonydis*) were collected from the same rodent species. The results show also that, *Haplopleura oenonydis*, *Pulex irritans*, *Hypoaspis smithii*, and *Amblyomma* sp., were collected only from the body of *R.r. alexandrines*, and absented from *R.r. frugivorus*. Data in the present study were in agreement with those obtained by (Abdel-Gawad Maher Ali, 1982), (Embarak, 1997), (Nava et al., 2003), (Erans, 1992) who found the same ectoparasites collected from the body of rodent species.

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