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# Seasonal Distribution of Rodent Species at Sohag and Qena

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**Abstract**

The aim of this study is to determine the population density of some rodent species attacked greenhouses. Experiments were carried out during two successive years (2020-2021) (2021-2022) in Sohag (umm Duma village tama district) and Qena Ezbat AL Busa (Abu Tasht district) Governorates. Results showed that *Mus musculus*, (Linnaeus), The house mouse, *Mus musculus* (Linnaeus), was the dominant mouse, followed by the Norway rat, *R. norvegicus*, and then the Nile rat, *Arvicanthis niloticus* (Desm.) while the least amount of white-bellied rat, Rattus *rattus frugivorus* (Rafinesque), was found in greenhouses in Sohag Governorate during two seasons. In comparison to farmed land in the Sohag Governorate, Survey analyzes the rodent species in the newly reclaimed scmi - desert area in Qena Governorate result proved that house mouse, *Mus musculus*(Linnaeus) was the highest caught number followed by the lesser *Gerbillus gerbillus* while the *R.rattus frugivours* was the lowest caught number in greenhouses at Qena Governorate on the other hand the highest population densities were trapped in autumn followed by summer in both two Governorate during season (2020-2021) in the second season (2021- 2022) the highest population densities were trapped in summer followed by autumn in both Governorates.

**Keywords:**
Greenhouses, Rodents, Survey and Population density

# INTRODUCTION

The greenhouse is vulnerable to significant damage from rodents. Some species prefer to feed on germination of seeds, while others hunt for newly emergence plants. In the greenhouse, rats and mice eat the roots, bulbs, shoots, and leaves of several plants. Additionally, they have the ability to tunnel through growing material and chew holes in plastic containers. Rodents can raise questions about food safety because of the potential for contamination for those producing fresh produce in the greenhouse, such as salad greens, micro-greens, tomatoes, etc. Growers are required by FDA food safety rules to use practical precautions to prevent rats from entering the greenhouse. It's critical to identify the species of the rodent causing problems in greenhouse. The most common greenhouse rodent pests in Sohag and Qena Governorates are *Mus musculus, R. norvegicus, R.rattus frugivours ,A.aniloticus and Gerbillus gerbillu*s. Many researchers conducted survey investigations, like Salit *et al.* (1982), Researchers compared the types of rodents found in newly reclaimed semi-desert land to those found in farmed areas in the Assiut Governorate. They demonstrated that Rattusrattus alexandrines (Geof.) raised 44.36%, Gerbillus spp. Desm., 38.96%, Rattusrattus frugivorus (Rafi.) 15.38%, Arvicanthis niloticus (Desm.) 1.77% and a few individuals of the smaller jerboa, Jaculus jacullus. (Linn.) and Meriones shawi Rozet in the newly reclaimed semi-desert area while Arvicanthis niloticus (Desm.) was the most common rodent species with some individuals of R.rattus frugivorus (Rafi.) in the cultivated lands. According to Hussien (1991), the most common rodent species in field crops at seven districts in the Beni Suef Governorate Were M. musculus Linn, A. niloticus (Desm.), R. r. frugivorus, and R. norvegicus. Rady, et al., (2001) Said that between the middle of January 1996 and the middle of January 1997, Egypt's assessment of rodent species in several farmed regions in Koalubia used snap traps baited with tamia to infest crops of vegetables (tomato, horse bean, and soyabean), maize, and wheat. The house mouse, *Mus musculus*, the climb rat, *R. rattus*, and the Norway rat, *Rattus norvegicus*, were the three rodent species that were most common in the trial fields. Assiut Governorate's University Farm in Assiut, in the two different locations, Abd El Galil (2005) investigated the survey and distribution of rodent species. In field crops, the Roof rat (Rattus rattus), followed by the Norway rat (Rattus norvegicus), the Nile grass rat (Avicanthis niloticus), and the Demsey rat (Gerbillus pyrimeidum), existed in high numbers (65.3%, 18.1%, 12.5%, and 4.2%, respectively). Desoky *et al.* (2014) reported finding three species of rats living in the experimental station of the Faculty of Agriculture, El-Kawther city, Sohag University, with the white-bellied rat, R. r. frugivorus, being the predominate species (94.27%). These three species of rats included the Nile grass rat, *Ar-rvicanthis niloticus* (4.44%), the Nile grass rat, *Gerbillus sp* .was recorded (1.08%) from newly reclaimed area. Rizket ,t *et al.* (2017), R. rattus was present in five species of the Muridae family that were grown in Akhmim district (Sohag Governorate) between 2014 and 2016 (wheat, clover, maize, sun flour, and sugarcane are examples of field crops.), as well as at a city market for produce and a settlement in the countryside. Norvegicus, *R. Niloticus, A. M. musculus and A. cahirinusus.* Abd El Galil (2019) The current study was conducted in Sahel Silem District, Assiut Governorate, where field crops included wheat, broad beans, maize, sorghum, Egyptian clover, onions, and garlic; some vegetable crops included tomatoes, peppers, and eggplant; and some fruit orchards included pomegranate, citrus, mango, and palm, between March 2015 and February 2017. revealed that three kinds of rats predominated in all habitats: the fruit rat, *R. rattus (Linnaeus)*, the wild Norway rat, *R. norvegicus* (Berkanhout), and the field Nile rat, A. niloticus (Desmart), which is also known as the Nile grass rat. The earlier data demonstrated that *R. rattus* was the majority species, followed by *A. niloticus*, and that all species found belonged to the family *Muridae. R. norvegicus*, meanwhile, was the species that was least frequently encountered during the course of the two succeeding seasons. According to Desoky and Baghdadi (2019), four rodent species were present in the research region, as well as in

recently and older reclaimed sites. A species known as smaller garbia belonged to the family Cricetidae. Three species of the family *Muridae* and *Gerbillus gerbillus* Olivier were identified. The field rat *Arvicanthis niloticus Desmarest*, the white bellied rat *Rattus rattus frugivorus* Linnaeus, the Norway rat *Rattus norvegicus Berkenhout*, and the house mouse M. musculus Linnaeus are all members of the family *Muridae*. Dongol (2021) survey rodent species in orchards at Sohag governorate and reported that, *R. rattus frugivorus*, *R rattus* alexandrines *Arvicanthis niloticus* and *M. musculus* were attacked the citrus farms (Orange and Mandarin)

## MATERIALS AND METHODS

For this study two greenhouses ware chosen to carry this study first in cultivated land in umm Duma village tama district in Sohag governorate second in Newly reclaimed scmi – desert in Ezbat AL Busa Abu Tasht district Qena Governorate during two successive years (2020-2021) and (2021- 2022). Every month at 6 o'clock, bread was used as a bait to set traps 10 meters apart. After being checked in the morning for three consecutive nights, the bait was changed to a fresh one. According to Osborn and Helmy (1980), trapped rats were taken to the lab for identification. Each rodent species' collection date and number were recorded. Every species' proportion was calculated.

## RESULTS AND DISCUSSIONS

The current investigation focused on the variety of rodent species discovered in greenhouses in the governorates of Sohag and Qena.

**Sohag Governorate.**

The results of the study are shown in Tables (1 and 2).

1- The Nur way rat, *R. norvegicus*, was present in both years (2020-2021) and (2021-2022), with 34.7% and 33.3%, respectively.

2- The percentage of the house mouse, *Mus musculus*, occurring in the first and second years was 33.1% and 42%, respectively.

3- The grass rat of the Nile. *A. niloticus* had a first-year representation of 25.4% and a second-year representation of 17.4%.

4- The proportion of the white-bellied ret, *R.r. fugivorus*, was 6.8% in the first year and 7.2% in the second.

This data agree with that obtained by Rizk *et al.*, (2017) *R. rattus* was present in five species of the Muridae family that were grown in Akhmim district (Sohag Governorate) between 2014 and 2016 (field crops, including wheat, clover, maize, sun flour, and sugarcane), as well as at a city market for produce and a settlement in the countryside. *Norvegicus, R. Niloticus, A. M. musculus and A. cahirinusus.* Abd El Galil (2019) revealed that three kinds of rats predominated in all habitats: the fruit rat, R. rattus (Linnaeus), the wild Norway rat, *R. norvegicus* (Berkanhout), and the field Nile rat, *A. niloticus (Desmart*), which is also known as the Nile grass rat. The earlier data demonstrated that R. rattus was the majority species, followed by *A. niloticus*, and that all species found belonged to the family Muridae. On the other hand, *R. norvegicus*, was the least species frequently encountered during the course of the two succeeding seasons.

Table 1. Seasonal and monthly variations of rodent species found in greenhouses on cultivated land in the Sohag governorate in 2020 and 2021.

| Season | Month | Total rodent caught | Species | | | |
|---|---|---|---|---|---|---|
| | | | *M.musculus* | *R.norvegicus* | *A.niloticus* | *R.r.frugivorus* |
| **Winter** | December | 4 | 2 | 2 | 0 | 0 |
| | January | 5 | 2 | 2 | 0 | 0 |
| | February | 6 | 3 | 3 | 1 | 0 |
| **Total** | | 15 | 7 | 7 | 1 | 0 |
| **Spring** | March | 8 | 3 | 3 | 1 | 1 |
| | April | 8 | 3 | 3 | 1 | 1 |
| | May | 8 | 2 | 4 | 1 | 1 |
| **Total** | | 24 | 8 | 10 | 3 | 3 |
| **Summer** | June | 14 | 4 | 4 | 5 | 1 |
| | July | 14 | 4 | 3 | 5 | 2 |
| | August | 13 | 4 | 4 | 4 | 1 |
| **Total** | | 41 | 12 | 11 | 14 | 4 |
| **Autumn** | September | 13 | 4 | 4 | 4 | 1 |
| | October | 14 | 4 | 5 | 5 | 0 |
| | November | 11 | 4 | 4 | 3 | 0 |
| **Total** | | 38 | 12 | 13 | 12 | 1 |
| **overall total** | | 118 | 39 | 41 | 30 | 8 |
| **Percentage** | | | 33.1 | 34.7 | 25.4 | 6.8 |

Table 2. Seasonal and monthly variations of the rodent species found on cultivated land in the Sohag governorate in 2021 and 2022.

| Season | Month | Total rodent caught | Species | | | |
|---|---|---|---|---|---|---|
| | | | *M.musculus* | *R.norvegicus* | *A.niloticus* | *R.r.frugivorus* |
| **Winter** | December | 1 | 0 | 1 | 0 | 0 |
| | January | 2 | 0 | 2 | 0 | 0 |
| | February | 3 | 0 | 3 | 0 | 0 |
| **Total** | | 6 | 0 | 6 | 0 | 0 |
| **Spring** | March | 6 | 2 | 2 | 1 | 0 |
| | April | 8 | 3 | 2 | 2 | 1 |
| | May | 7 | 3 | 2 | 2 | 1 |
| **Total** | | 21 | 8 | 6 | 5 | 2 |
| **Summer** | June | 9 | 3 | 3 | 2 | 1 |
| | July | 8 | 4 | 2 | 1 | 1 |
| | August | 9 | 3 | 2 | 2 | 0 |
| **Total** | | 24 | 10 | 7 | 5 | 2 |
| **Autumn** | September | 8 | 3 | 3 | 1 | 1 |
| | October | 6 | 3 | 2 | 1 | 0 |
| | November | 4 | 2 | 2 | 0 | 0 |
| **Total** | | 18 | 8 | 7 | 2 | 1 |
| **overall total** | | 69 | 29 | 23 | 12 | 5 |
| **Percentage** | | | 42 | 33.3 | 17.4 | 7.2 |

**Qena governorate.**

Data in tables (3-4) and proved that three rodent species were, study area, newly reclaimed lands one species belonged to family cricetidae, named lesser garbia *Gerbillus gerbillus* olivier was recorded (28.4) in the 1st season and (35.7%) in the 2 nd season. and two species of family muridae were the house mous *Mus musculus* was (59.5%)in the first year and (53.6%) in the second year. and the white bellied

rat, *R. rattus frugivours* was recorded (12.2) in the 1st season and (10.7%) in the 2 nd year. This data is in agreement with. Desoky *et al.*, (2014) discovered that the experimental station of the Faculty of Agriculture, El-Kawther city, Sohag University, was home to three species of rats, with the white-bellied rat, *R. r. frugivorus*, being the dominant species with (94.27%). These three species of rats included the Nile grass rat, *A rvicanthis niloticus* (4.44%). The Nile grass rat, *Gerbillus sp.*.Was recorded (1.08%) from newly reclaimed area Desoky and Baghdadi (2019) showed that four rodent species were present in the research region, as well as in recently and older reclaimed sites. A species known as smaller garbia belonged to the family Cricetidae. Three species of the family Muridae and *Gerbillus gerbillus* Olivier were identified. The field rat *Arvicanthis niloticus* Desmarest, the white bellied rat *Rattus rattus frugivorus* Linnaeus, the Norway rat *Rattus norvegicus* Berkenhout, and the house mouse *Mus musculus* Linnaeus are all members of the family Muridae.

Table3. Seasonal and monthly variations of rodent species kept in greenhouses on reclaimed land in the Qena governorate in 2020 and 2021.

| Season | Month | Total rodent caught | Species | | |
|---|---|---|---|---|---|
| | | | ***M.musculus*** | ***Gerbillusgerbillus*** | ***R.r.frugivorus*** |
| **Winter** | December | 1 | 0 | 1 | 0 |
| | January | 2 | 0 | 2 | 0 |
| | February | 3 | 0 | 3 | 0 |
| **Total** | | 6 | 0 | 6 | 0 |
| **Spring** | March | 5 | 2 | 2 | 1 |
| | April | 7 | 3 | 2 | 1 |
| | May | 7 | 3 | 2 | 1 |
| **Total** | | 19 | 8 | 6 | 3 |
| **Summer** | June | 8 | 3 | 3 | 1 |
| | July | 9 | 4 | 2 | 1 |
| | August | 9 | 3 | 2 | 1 |
| **Total** | | 26 | 10 | 7 | 3 |
| **Autumn** | September | 8 | 3 | 3 | 1 |
| | October | 11 | 3 | 2 | 0 |
| | November | 4 | 2 | 2 | 2 |
| **Total** | | 23 | 14 | 6 | 3 |
| **overall total** | | 69 | 44 | 21 | 9 |
| **Percentage** | | | 59.5 | 28.4 | 12.2 |

Table 4. Seasonal and the monthly varieties of rodent species in greenhouses in reclaimed land at Qena governorate during 2021 and 2022.

| Season | month | Total rodent caught | Species | | |
|---|---|---|---|---|---|
| | | | *M.musculus* | *Gerbillusgerbillus* | *R.r.frugivorus* |
| **Winter** | December | 0 | 0 | 0 | 0 |
| | January | 0 | 0 | 0 | 0 |
| | February | 2 | 1 | 1 | 0 |
| **Total** | | 2 | 1 | 1 | 0 |
| **Spring** | March | 3 | 2 | 1 | 0 |
| | April | 5 | 3 | 1 | 1 |
| | May | 6 | 3 | 2 | 1 |
| **Total** | | 14 | 8 | 4 | 2 |
| **Summer** | June | 7 | 4 | 2 | 1 |
| | July | 6 | 2 | 3 | 1 |
| | August | 8 | 4 | 3 | 1 |
| **Total** | | 21 | 10 | 8 | 3 |
| **Autumn** | September | 8 | 4 | 3 | 1 |
| | October | 8 | 5 | 3 | 0 |
| | November | 3 | 2 | 1 | 0 |
| **Total** | | 19 | 11 | 7 | 1 |
| **overall total** | | 56 | 30 | 20 | 6 |
| **Percentage** | | | 53.6 | 35.7 | 10.7 |

Over the course of two consecutive years (2020-2021) and (2021-2022), the total number of different species of rodents caught in greenhouses during the different seasons (Winter, Spring, Summer, and Autumn) were (15, 24, 41, and 38 individual) and (6, 21, 24, and 18 individual) and (6,21,24 and 18 individual). Over the course of two consecutive years (2020-2021) and (2021-2022), the total number of different species of rodents caught in greenhouses during the different seasons (Winter, Spring, Summer, and Autumn) was (6, 19, 26, and 23 individual) and (2, 14, 21, and 19 individual) at Qena Governorate Ezbat AL Busa (Abu Tasht district). In this study, summer and autumn saw the highest seasonal rodent populations, while winter saw the lowest. This might be because the rodents stayed inside their homes between December and January to avoid the cold weather. The house mouse, *Mus msculus*, is the dominant species in sugar cane, followed by *A. niloticus*, according to the data, which are in agreement with those obtained by Bakri-Eman (2004). The white-bellied rat, *R. r. fugivorus*, was the least common species to be caught in sugar cane plantations in Sohag Governorate Gazert Shandweel village between 2001 and 2002. Numerous researchers have conducted population density studies, although it is not the case with density. In cultivated and semi-arid freshly farmed areas, rodent population density was reported by Abdel-Gawad *et al*. in 1982. They discovered that in the two areas, spring and autumn saw the highest species densities, while summer and winter saw the lowest densities. El-Nashar (1998) demonstrated that, given the field conditions in the Mallawy district, the autumn season was best for Egyptian field‘s rodent species. Autumn was the greatest season for Egyptian field rodent

species in the Sohag Governorate, according to Bakri-Eman (2004), followed by summer, winter, and spring. El-Rawy (2017) demonstrated that, in the field conditions of the Qena Governorate, the spring season was optimum for Egyptian field rodent species, followed by the autumn, summer, and winter seasons. Dongol (2021) indicated that the autumn season, followed by spring, summer, and winter, was most suited for Egyptian field rodent species in the Sohag Governorate's field settings.

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# التوزيع الشهري والموسمي لأنواع القوارض في محافظتي سوهاج وقنا

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## الملخص العربي

الهدف من هذه الدراسة هو تحديد الكثافة السكانية لبعض أنواع القوارض التي تعرضت للهجوم على البيوت المحمية .تم تنفيذ التجارب خلال عامين متتاليين (2020-2021) (2021- 2022) في محافظتي سوهاج (قرية أم دومة مركز طما) ومحافظتي قنا عزبة البوسة (مركز أبو طشت .( أظهرت النتائج أن فأر المنزل *Mus musculus (Linnaeus)* كان هو الفأر السائد، يليه فأر النرويج *R. norvegicus* ، ثم فأر النيل *Arvicanthis niloticus (Desm.)* في حين كان الأقل فئران .تم العثور على كمية من الجرذ ذو البطن البيضاء *Rattusrattus frugivorus (Rafinesque)*في الدفيئات الزراعية بمحافظة سوهاج خلال موسمين .بالمقارنة مع الأراضي المستزرعة في محافظة سوهاج، قام المسح بتحليل أنواع القوارض في المنطقة الصحراوية المستصلحة حديثا في محافظة قنا، حيث أثبتت النتائج أن الفأر المنزلي *Mus musculus (Linnaeus)*كان هو أعلى عدد تم اصطياده يليه *Gerbillus gerbillu*الأصغر، بينما كان الفأر المنزلي *Mus musculus (Linnaeus)*هو أعلى عدد تم اصطياده يليه فأر المنزل الأصغر *Gerbillus gerbillus* بينما كان الفأر المنزلي *Mus musculus (Linnaeus)* هو أعلى عدد تم اصطياده يليه فأر المنزل الأصغر *Gerbillus gerbillus*. كان *R.rattus frugivours* أقل عدد تم اصطياده في الدفيئات الزراعية بمحافظة قنا من ناحية أخرى كانت أعلى كثافات سكانية تم صيدها في الخريف يليه الصيف في كل من المحافظتين خلال الموسم (2020-2021) في الموسم الثاني (2021-2022 (وكانت أعلى الكثافات السكانية محاصرة في الصيف يليها الخريف في كلا المحافظتين