

Trapping to Estimate Rodent Populations A Demonstration Project

Terry L. Steinhart, ISU field specialist/swine,
Arlyn W. Karsten, D.V.M. assistant professor
Agricultural Sciences Kirkwood Swine Education
Center

ASL-R1786

Summary and Implications

The protocol used to estimate the number of rodents in a swine facility is from the Pennsylvania Egg Quality Assurance Program (PEQAP). The protocol has been adjusted for use with swine facilities. An infrared camera was used to see the rate of infestation. By using both methods to estimate the severity of the problem, the confidence of the protocol was raised. Dr. Karsten, Assistant Professor of Agricultural Sciences at Kirkwood, stated that mice were very seldom seen. Evidence of mouse droppings and chewing on paint sticks was observed. At the Kirkwood facility no mice were filmed with the infrared camera and no mice were trapped.

At a producer's farm, the manager stated that mice are seen during the day and he stated that the feeders show signs of mouse droppings. When the lights are turned on, many mice are scrambling to hide. The infrared camera filmed up to seven mice per feeder. Fortythree mice were trapped at day 3 and 29 more by day 7, for a total of 72 mice trapped.

Estimating rodent infestation with the Tin Cat rodent traps appears to be an effective estimation method. The Mississippi State visual estimation is a good indicator for assessing a need to check for rodent infestations. The "Robo-Rat" works for visual evaluation, but is not a practical on farm tool for assessing rodent populations.

Introduction

Mice and rats can be a problem around swine facilities, if a control program is not in place. They spread disease that causes economic losses by their consumption and contamination of feed. Buildings can suffer major damage from gnawing of holes in curtains, insulation, and building structure. (1)

Dr. Karsten indicated that he was not satisfied with the rodent control procedures that Kirkwood was using at the swine facility. He believed that the students and staff in the swine facility could initiate a rodent control program that would better meet their needs. The first step was to determine the degree of infestation in the swine buildings at Kirkwood. It was determined that rodents would most likely

be found in a small area between an evaporative cool cell and a curtain.

Three methods to estimate rodent infestation were used: Infrared camera to film the number of rodents, visual observation, and trapping using the Pennsylvania Egg Quality Assurance Program (PEQAP) method.

Table 1. Diseases of swine in North America that rodents may harbor or transmit. (1)

Disease	Agent	Rodents implicated
Bordetellosis	Bacteria	Rats
Encephalomyocarditis	Virus	Rats, mice
Leptospirosis	Bacteria	Rats, mice
Pseudorabies	Virus	Rats*
Salomonellosis	Bacteria	Rats, mice
Swine dysentery	Bacteria	Rats, mice
Toxoplasmosis	Protozoan	Various rodents
Trichinosis	Nematode	Rats

*Opinions differ on the significance of rodents as a reservoir or vector.

Results and Discussion

The infrared camera is called "Robo-Rat." The camera is mounted on a small box with hydraulic motors that control the wheels. The idea is to scout for mice from a remote site by steering the camera around the facility. The camera was only used in a stationary position. After 24 hours of filming no observations were made.

A rule of thumb from Mississippi State says that never seeing rodents but seeing signs of them indicate from 1 to 100 on the premises. Occasional night sightings indicate from 100 to 500. Occasional daytime and numerous nighttime sightings indicate 400 to 1000. Seeing several during the daytime may indicate the presence of as many as 5,000. (3)

Dr. Karsten indicated that he or the students do not see mice but evidence is by droppings and gnawing on paint sticks.

There were no observations of rodents by filming or visually. A different approach was then used, by adapting a trapping procedure to estimate the number of rodents. The PEQAP developed a protocol for estimating rodent populations. (4)

The video taping at Kirkwood produced no sightings of rodents in the building at Kirkwood. The trapping procedure was then used and no rodents were trapped. The conclusion was that there is not a rodent problem at the Kirkwood facility. The mouse droppings and chewing of paint sticks appears to be very limited and only a few mice are actually in the facility. According to the Mississippi State guidelines

seeing signs of mice through droppings indicates 1-100 mice. It appears that the video taping, live catch trapping and Mississippi State estimation did work in this demonstration. Some of the reasons for low infestation rate at Kirkwood are as follows:

1. Excellent sanitation procedures.
2. Sweeping alleys.
3. Feed kept in containers and off floors.
4. Feeders kept in good working order and properly adjusted.
5. Bait stations maintained.
6. Doors maintained in good condition.
7. Rock surrounding buildings and elimination of vegetation around buildings.

Figure 1. Building site well maintained.



Because the protocol appeared to work at the lower level, we wanted to see whether the protocol was working at a higher level of rodent infestation. A producer said he was seeing mice during the day in his finishing building. According to the Mississippi State estimation the producer could have as many as 400–1,000 and possibly up to 5,000 mice. The video system was set up on one feeder. The videotaping started at 4:00 pm and set to tape for 4 hours. Within 30 minutes mice were showing up in the feeder (Movie 1). At the 2-hour mark 5 mice were observed in one feeder with more mice coming and going. It is difficult to get any kind of number count but it was obvious that there is a serious rodent problem.



Movie 1. This is a Quick Time movie of mice in the feeder. Double click on the icon to activate your Quick Time program.

The following protocol is adapted from the PEQAP for assessment of rodent infestation. Place 12 Tin Cat rodent traps in the areas where recent signs of rodent activity are observed. Traps are generally placed in two areas, along the walls of walkways (side, ends and middle) and on curtain

ledges. Other areas where traps may be set include feed rooms, feeders, fan housings, and pit openings.

1. Bait traps with a small handful of hog feed.
2. Place 12 traps in areas suggestive of current mouse activity. Use a minimum of 15 foot distance between traps.
3. Check the traps after 2 to 4 days. Remove, count, and record the number of mice caught.
4. Move the traps that have not caught any mice to a different location, a minimum of 15 feet away.
5. Check the traps again 7 days after they were first placed.
6. Record the total number of mice caught for the week.

Rodent Index (RI) is based on the number of total mice caught in 7 days and is used to estimate the mouse population. The RI is always based on the number of mice caught in 12 Tin Cat traps in seven days.

Estimate the rodent population by applying the number of mice as determined above to the Rodent Indexing table below. Estimate the current rodent population as low 1, moderate 2, or high 3.

Table 2. Rodent Index.

Number of Mice Caught in 7 days with 12 traps	Rodent index	Description of Index
0 –10	1	Low
11-25	2	Moderate
26 or more	3	High

The live catch traps were then used and evaluated. Twelve live traps were set and checked on day 3. Thirty-nine mice and one liter of four were trapped. On day 7, 29 mice were captured. Referring to the Rodent Index for live trapping this was a definite three and indicated a high rate of infestation (Table 2).

Figure 2. Victor Tin Cat live mouse trap.



An equation is used to adjust for numbers of mice caught, if traps are left on the farm for periods greater or less than 7 days. The equation can be used for more or less traps

set. This requires that the total number of mice caught be multiplied by seven and the product divided by the number of days the traps are set. You also can adjust for more or less traps used. This number is then applied to the Rodent Index (table 2).

Rodent Index Formula

$$\begin{array}{rcccccccc}
 \text{No. of} & \div & \text{No. of} & \div & \text{No.} & & & & \text{No.} \\
 \text{mice} & & \text{useable} & & \text{of} & \times & 12 & \times & 7 & = & \text{of} \\
 \text{caught} & & \text{traps} & & \text{days} & & & & & & \text{mice} \\
 \text{in all} & & & & \text{traps} & & & & & & \text{for} \\
 \text{traps} & & & & \text{are} & & & & & & \text{Index} \\
 & & & & \text{set} & & & & & &
 \end{array}$$

(Formula from H. M. Opitz, University of Maine)

To determine the number of rodents in a swine facility, producers need methods to evaluate rodent problems. “Robo-Rat” is a nice visual aide but the infrared camera is an experimental model and not available to producers. It is also expensive and not convenient to use. Using the Mississippi visual appraisal allows producers to get an estimate of mouse numbers. Follow-up needs to be made by using the PEQAP Tin Cat protocol for a more accurate assessment.

References

1. Pork Industry Handbook, PIH107 Revised May 1997, Authors Robert M. Timm, Rex E Marsh, Scott E. Hygnstrom, Robert M. Corrigan.
2. Standard Operating Procedures for Rodent Control in Swine Facilities. LiphaTech booklet.
3. Pennsylvania Egg Quality Assurance Program (PEQAP), David J. Henzler, DVM, Epizootiology Program Manager, Pennsylvania Department of Agriculture, Harrisburg Pennsylvania.