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Electronic Identification of 4-H Livestock Projects

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Electronic Identification of 4-H Livestock Projects

Abstract
This article describes the effectiveness of electronic ear tags placed in 625 sheep and 508 4-H swine projects in five Indiana counties. Electronic ear tags worked well (>98% readability) in lambs when the tags were properly placed on the inside of the animal's ear. Electronic tags were either missing or failed to respond in 33% of the 4-H hogs at the Knox county fair, and swine members had a difficult time visually reading the number on the tags. Electronic ear tags speed up the check-in of animals at the county fair and reduce the potential for human error in transposing numbers.

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Introduction

In 1999, more than 24,000 Indiana 4-H members enrolled more than 48,000 animals in beef, sheep, and swine projects. A reliable form of livestock identification is required to ensure the integrity of the program by verifying that enrolled animals are the same individuals being exhibited at county and state fairs. Currently, beef and sheep projects are nose printed to verify animal identity. Nose prints are good for individually identifying animals, but they require a certain skill level and proper conditions in order to ensure reliable prints are obtained at the beginning of the project.

Five-digit ear tags are currently used in 4-H beef and sheep projects for visual identification. In swine, ear notches are used to individually identify each pig. Swine producers have relied upon ear notches to identify hogs for many years, but their use in a verification program is limited. Recent challenges with swine ear notches at the Indiana State Fair and various Indiana county fairs offer further proof that a more reliable verification system is needed.

Livestock shows in Oklahoma and Texas are currently using an electronic identification system for the nomination and verification of market steers and market lambs. A tiny electronic device, called a "transponder," is injected into animals with a syringe similar to those used to deliver vaccines to animals. The device remains with the animal for life, where it provides the animal's unique ID number any time it is scanned by a compatible electronic ID reader. The Tulsa State Fair uses biological ID to back up its electronic identification system. Four drops of blood are taken from each animal and stored on a card. Using an antibody profile assay, similar to DNA fingerprinting, blood samples can be collected from animals at a later date to verify they are the same individuals enrolled in the program to start with.

The objective of the study reported here was to test the effectiveness of electronic ear tags in 4-H sheep and swine projects.

Materials and Methods

The State 4-H Department at Purdue University entered into a contractual agreement with AgInfoLink, a global company specializing in individual animal identification, data collection, and livestock information management. AgInfoLink provided Purdue with electronic identification tags (EID) manufactured by the Allflex Company. These were ISO-compliant, tamper-evident tags with

laser-printed numbers. AgInfoLink also provided a software program called "FairTracks" to serve as the database to manage the individual identification of 4-H sheep and swine projects in five Indiana counties.

Data Collection

In early May, 508 4-H pigs in Knox County, Indiana were electronically identified with tamper-evident ear tags. A blood sample was collected from the anterior vena cava of the hogs by licensed veterinarians, placed on a specially designed card, and mailed to a DNA lab for storage until needed for animal identity verification at the county fair. In addition, the following information was entered into the FairTracks software program: the 4-H member's name and address, and the tag number, breed, sex and blood sample number of each animal.

This same procedure was applied to 625 4-H sheep projects in the following Indiana counties: Adams (52 animals), Hendricks (219 animals), Knox (94 animals), Lawrence (84 animals), and White (176 animals). Jugular blood samples were collected from lambs, placed on specially designed cards, and mailed to a DNA lab for storage. Following tagging, an Excel spreadsheet was developed for each county to assist them in the management of the data collected on their 4-H animals.

Table 1.
Summary of 4-H Animals Ear Tagged in Five Indiana Counties

County	Sheep	Swine
Adams	52	0
Hendricks	219	0
Knox	94	508
Lawrence	84	0
White	176	0
Total	625	508

Later that summer, the author attended the Adams, Hendricks, Knox, Lawrence, and White county fairs to assist with the weigh-in of the 4-H sheep and swine projects. The author used an electronic tag reading device to scan the electronic identification tags previously placed in the 4-H sheep in each of the above-mentioned counties and the 4-H swine in Knox County.

As animals were unloaded and placed on the scale for weighing, the scanner was waived over their ear tag to pick up the animal's identification number. A signal was then transmitted through an antenna connected to a laptop computer, where each animal's data had been stored in the FairTracks data base, since the animals were enrolled in the 4-H program in early May. Once the ear tag was scanned, the animal's identification number signaled the computer to bring that animal's record up on the screen, so the animal's weight could be added to the record.

This system proved to be fast (34 seconds/lamb in Hendricks County) and reduced the potential for human error. Blood samples were also collected on sheep that lost their electronic tag during the summer and on the champion and reserve champion market lamb at each of the five counties in the project. Knox county swine with missing or non-readable ear tags were re-tagged, but they were not bled for positive identification due to the large number of animals in this category.

Results

There were no missing ear tags in the 4-H lambs in Lawrence County. In Adams and Hendricks County, one lamb/county was found to have a split ear and was missing its ear tag. In each case, a parent had caused the tag to split the ear as they held the animal for their child to shear the lamb. In Knox County, two sheep tags were missing (one from a sheep with a split ear), and two tags would not produce a signal for the computer to read. In White County, the ear tags were placed upside down so that the numbers on the tag were visible to the people working with the sheep. This placement of the tags proved to be less successful than the tag placement in the other four counties in the study. Ten White county sheep tags were removed when they caused swelling of

the animal's ear a few days (3-5) after the original tagging (substantiated by a Purdue veterinarian to be caused by the tags placed too close to the animal's head). Four tags were caught on the fence and pulled apart. Two tags pulled out of their respective animal's ears (but were still intact), and two additional tags would not produce a signal for the computer to read. These results produced a 90% success rate on tags in White County, while the other four counties had at least a 96% success rate on sheep ear tags.

Table 2.
Summary of Electronic Ear Tag Readability in Sheep in Five Indiana Counties

County	# of Tags Put In	# of Tags That Failed	Readable Ear Tag Rate
Adams	52	1	98%
Hendricks	219	1	99%
Knox	94	4	96%
Lawrence	84	0	100%
White	176	18	90%
Total	625	24	96%

In Knox County, 242 of the 362 hogs that came to the county fair had "readable" tags (67% success rate). One hundred five hogs were missing their ear tag, and 15 tags would not produce a signal for the computer to read. The Knox county swine tags were placed in the animals' ear in the same manner as the White county sheep tags (with the numbered side showing on the back of the animal's ear). This orientation of the tags made them easier for other hogs to grab and chew on, which appears to account for part of the tag failure. On the other hand, there is no data to substantiate tag placement as the sole reason for the low success rate. Additional data should be collected to help explain the low retention rate of electronic ear tags in swine.

Table 3.
Summary of Electronic Ear Tag Readability in 4-H Swine Projects in Knox County, IN

# of Hogs Tagged	# of Hogs at County Fair	# of Hogs with Readable Tags at County Fair	Readable Ear Tag Rate
508	362	242	67%

Discussion and Conclusions

The use of electronic ear tags increased the speed and efficiency of weighing and checking in animals at the county fair and reduced the potential for human error in transposing numbers. Electronic ear tags provide a high-quality identification system, but they should not be relied upon for animal verification purposes (i.e., to replace nose printing or DNA finger printing).

Electronic ear tags worked well (>98% retention) in lambs when the electronic portion of the tags was placed on the inside of the animal's ear. Placing the electronic portion of the tag on the backside of the animal's ear increased the rate of tags being pulled out. A 33% failure of the tags placed in Knox county swine is too high to justify their use without further research.

Researchers found that Knox county 4-H swine members had a difficult time visually reading the number on the electronic tags. Some 4-H members became frustrated trying to determine which one of their hogs was supposed to be in a certain class during the swine show. Other brands of electronic ear tags should be tested, and further research should be conducted in swine to determine if placing the electronic portion of the ear tag on the inside of the hog's ear will improve ear tag retention.

The researchers would also recommend that tag manufacturers investigate the possibility of placing the electronic transponder in the traditional (non-electronic) swine tag that is rectangular in shape and displays a number on the outside of the tag that is from 1.25 - .75 inches in height. This would create an electronic swine tag with the added feature of a visual and readable number.

Collecting blood samples for a biological ID worked well in sheep. Researchers were able to collect jugular blood samples quickly and easily, as long as the lamb's neck had been sheared prior to collecting samples.

Collecting swine blood samples was more time consuming, but the blood was also used to test for pseudorabies, which is a required test for each of the animals to be exhibited at the county and/or state fair. Thus, collecting the swine blood samples saved the veterinarians from going to each 4-H member's farm later in the summer and stressing hogs at heavier weights and at hotter temperatures. The only negative issue resulting from using blood samples for biological ID in this project was that it took 2 weeks to get results back from the DNA lab, instead of the 48 hours that had been promised.

The information learned from electronic and biological identification of animals in five Indiana counties will allow the State 4-H staff to be more efficient as they implement the program on a statewide basis and will provide valuable information to Extension personnel and livestock show managers in other states who are trying to decide whether they want to use electronic ID. Having animals electronically identified and the demographic information of the 4-H members entered into a computer software program will save valuable time for Extension personnel and volunteer leaders during check-in at county and state fairs across the country. Having 4-H animals electronically identified will also place 4-H families in a positive position, if the federal government implements a mandatory animal ID program in future years.

Biologically identifying beef, sheep, and swine projects, using blood or hair samples, will improve the integrity of the 4-H livestock program nationwide by deterring the swapping of animals that has occurred in several instances in past years. The confusion from reading swine ear notches will have been eliminated, and the inconvenience of collecting beef and sheep nose prints will be a thing of the past. Although this research found blood samples to be easily obtained from 4-H sheep and swine projects, the DNA lab reported a preference for hair samples for future DNA testing. Using hair samples for animal verification may also be preferred by animal rights groups, as well as by the general public.

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