

The Microchip World

Recent Advances and Options for Shelters and Veterinarians

Linda K. Lord, DVM, PhD, Assistant Professor
Department of Veterinary Preventive Medicine, The Ohio State University
lord.19@osu.edu

Introduction

Currently a national standard for microchip identification of companion animals does not exist in the United States (U.S.). Throughout much of the world, the International Organization for Standardization (ISO) standard of 134.2 kHz for radio frequency identification devices (RFID) has been adopted and implemented as the preferred or sole RFID technology for companion animals.^{1,2} This standard has been endorsed by groups such as the American Veterinary Medical Association, the American Animal Hospital Association, the Humane Society of the United States, the American Society for the Prevention of Cruelty to Animals, and the Society of Animal Welfare Administrators, as well as the National Standards Institute (ANSI). In the U.S., however, the non-ISO 125 kHz microchip is still predominantly utilized.

With the majority of the current U.S. microchips functioning at 125 kHz, there are now 3 distinct frequencies in the U.S. market. In the last 2 years the 134.2 kHz ISO microchip as well as the 128 kHz microchip have been introduced into the U.S. In addition, the 125 kHz microchips can be encrypted, meaning they are read with a different communication protocol than the 125 kHz unencrypted microchips. With the introduction of multiple microchips operating at different frequencies as well as different communication protocols (i.e., encrypted vs. unencrypted), several universal scanners that can read or detect all three frequencies have been introduced. A functional radio frequency identification system is based on three core components, the microchip, a reader and a database that links the chip number to the pet owner. Based on global dynamics and the introduction of the 134.2 kHz ISO microchip in the U.S., many believe a move towards national adoption and implementation of the ISO standard is inevitable. However, regardless of whether this occurs or not, a robust, functional universal scanner is of paramount importance in bridging the current technological incompatibility that exists within the U.S.

There has been growing concern that the new universal scanners may not sufficiently or rapidly detect the presence of some microchips. In order to address this concern, the authors developed two studies to test the sensitivity of some of the scanners in the market for reading various brands of microchips operating at the different frequencies both in experimental and field conditions. Additional detail can be found in the published studies.^{3,4} Findings for the field study conducted in the shelter environment are presented here.

Microchip Scanner Sensitivity

The microchips were chosen for testing that represented the major manufacturers and frequencies in the U.S. The microchips evaluated were the Avid FriendChip microchip (encrypted 125 kHz), HomeAgain (Digital Angel) microchip (unencrypted 125 kHz), 24PetWatch (Allflex) microchip (unencrypted 125 kHz), American Kennel Club-Companion Animal Recovery (AKC-CAR) ID System (Trovan) microchip (128 kHz), Bayer ResQ (Datamars) microchip (134.2 kHz), and the HomeAgain (Digital Angel) microchip (134.2 kHz). For the 4 scanners included in the studies, the read (detect presence of microchip and read/display the number) and detection (detect presence of microchip only) capabilities are given in **Table 1**.

In the shelter study, at each of the 6 shelters, 440 dogs and cats were implanted with a microchip and 220 animals were used as controls. Each of the 6 shelters tested a different microchip brand. The people that were scanning in the study were blinded

as to whether an animal had a microchip and the order in which control or implanted animals were scanned was randomly assigned. In addition, the scanners were randomly assigned to different people for different animals to avoid any operator bias in the scanning process. All participants were trained by a study coordinator to follow proper scanning technique as described in **Table 2**.

The sensitivity (sensitivity defined as the percentage of successful scans (read or detected) for each scanner for each microchip) for each of the scanners for each microchip are given in **Table 3**.



COLLEGE OF
VETERINARY MEDICINE

Recent Advances and Options for Shelters and Veterinarians

Maximizing the Success of Detecting a Microchip

Although no single scanner performs with 100% sensitivity, several key points can be made to optimize the effectiveness of the microchip scanning process:

- Use proper scanning technique and make sure all personnel are trained
- Scan an animal more than once. In the shelter environment, animals should be scanned at intake, at medical processing, before euthanasia, and before adoption
- Have a regular battery change schedule and use a high quality battery brand such as Energizer
- Avoid interference by scanning away from computers, metal tables and fluorescent lighting. Remove any metal collars prior to scanning

Making the Registration Process Successful

A microchip without a current registration is an ineffective method for pet reunification. It is important that both shelters and veterinarians recognize and support the microchip registration process to maximize the likelihood of reuniting pets with their families. Several steps that shelters and veterinarians can take to help with microchip registration include:

- **NEVER** separate the microchip implantation process from the registration process with a national microchip registry. Whether or not you are a shelter or a veterinarian, you need to bundle microchip registration with microchip implantation. If at all possible, collect the information and process the registration for the client or adopter to make sure this step is performed.
- Consider contacting more than one registry if the manufacturer's registry doesn't have current registration information for a microchip. Microchips are registered with multiple registries and this may help to find the owner.
- If in a shelter environment, always contact the microchip registry for owner surrender animals as well as stray animals. Instances occur where the person surrendering the animal is not the original owner and the original owner still wants to reclaim their lost pet.
- If in a veterinary office, scan animals at the time of the annual wellness examination. Make sure the microchip is still functioning and remind owners to update their information.

The Total Identification Package

Microchipping alone does not constitute a total identification package. To help maximize the likelihood of successful pet reunification, remember these points:

- Visual identification is the easiest method for pet reunification. Consider sending home collars and custom identification tags with adopters, placing a tag engraving machine in your lobby, and offering tags at any microchip clinics. Veterinarians can discuss visual identification with clients during the annual wellness examination.
- Educate your adopters and clients on the importance of pet identification and what to do if an animal becomes lost. Helpful brochures are available for this education.⁵

References

1. International Organization for Standardization (ISO). ISO 11784 - Radio-frequency identification of animals – Code structure. Second edition. 1996-08-15.
2. International Organization for Standardization (ISO). ISO 11785 - Radio-frequency identification of animals – Technical concept. First edition. 1996-10-15.
3. Lord, LK, Pennell, ML, Ingwersen, W, Fisher, RA, Workman, JD. In vitro sensitivity of commercial scanners to microchips of various frequencies. Journal of the American Veterinary Medical Association. 2008 Dec 1;233(11):1723-28.
4. Lord, LK, Pennell, ML, Ingwersen, W, Fisher, RA. Sensitivity of commercial scanners to microchips of various frequencies implanted in dogs and cats. Journal of the American Veterinary Medical Association. 2008 Dec 1;233(11):1729-35.
5. "Plan for a Happy Reunion" pet identification brochure. Available at: vet.osu.edu/brochures.

Other Resources

AVMA

- Objectives and Key Elements Needed for Effective Electronic ID
avma.org/issues/policy/electronic_identification.asp
- Backgrounder
avma.org/issues/microchipping/microchipping_bgnd.asp
- Frequently asked questions
avma.org/issues/microchipping/microchipping_faq.asp

WSAVA

wsava.org/MicrochipID.htm

AAHA Training

aahanet.org/education/microchip_scanning.aspx

OSU Brochures

vet.osu.edu/brochures



COLLEGE OF
VETERINARY MEDICINE

Recent Advances and Options for Shelters and Veterinarians

Table 1.

Microchip scanners included in scanner controlled and field studies.

| Manufacturer | Distributor | Trade Name | Microchip Read / Detection Capabilities (*) | | |
|---------------------|---|---|---|---------|-----------|
| | | | 125 kHz (**) | 128 kHz | 134 kHz |
| Datamars S.A. | Bayer Animal Health ResQ Pet Identification System | iMax Black Label Portable Reader | Read | Read | Read |
| Digital Angel, Inc. | Schering-Plough HomeAgain Proactive Pet Recovery Service | Universal WorldScan Reader | Read | Read | Read |
| Trovan | American Kennel Club Companion Animal Recovery ID System | Multi-System Pocket Scanner LID560 | Read | Read | Detection |
| Avid | Avid | MiniTracker I Universal Multi-Scan 125 | Read | None | None |

* Read is defined as the ability of the scanner to detect the microchip and read/display the number; Detection is defined as the ability of the scanner to only detect the presence of the microchip

** Both 125 kHz encrypted and unencrypted microchips at this frequency

Table 2.

Scanning protocol for 4 scanners used in a field study scanning microchips in 6 shelters.

You will follow the same basic scanning protocol when using each of the 4 types of scanners. It is important that you use consistent speed, scanner orientation, scanning pattern, and scanning distance with all scanners. It is also important to cover all appropriate areas in the scan. Please note this is the technique you should use when scanning any animal in a real setting outside of this study. Each of these major areas will be addressed below.

| | |
|--------------------------------|---|
| Scanner orientation | The iMax Black Label, the Home Again Pocket Reader and the AVID Mini Tracker I should all be held parallel to the animal. The Trovan Pocket Scanner should be held perpendicular to the animal and you should start with the scanner parallel to the animal's spine. |
| Scanning distance | Each scanner should be held in contact with the animal during the scanning process. |
| Scanner speed | You should not scan any faster than ½ foot per second. |
| Areas of animal to scan | The standard implant site is midway between the shoulder blades. Scanning should begin and concentrate over this area. If the microchip is not detected here, you should scan down the back, on the sides, neck and shoulders and down to the elbows. |
| Scanning pattern | The scanner should be moved over the scanning areas in an "S" shaped pattern in a transverse direction (from side to side). If no microchip is detected, the scanner head should be rotated 90 degrees and then the scan should be repeated in an "S" shaped pattern in a longitudinal direction. As the scanner is moved in this "S" shaped pattern over the various contours of the animal's body, it will maximize the ability of the scanner to detect the microchip, regardless of the orientation of the microchip. Care should be taken to not make the "S" shaped pattern so large that areas of the animal's body to be scanned are completely missed. |

Recent Advances and Options for Shelters and Veterinarians

Table 3.

Sensitivity of scanners in detecting 6 different microchips in shelters.

| Microchip | % Read/Detected (95% Confidence Interval) | | | |
|------------------------|---|-----------------------|----------------------|----------------------|
| | AKC | Avid | HomeAgain | Bayer |
| 24 PetWatch (125 kHz) | 66.6 (62.2, 71.0) | 99.6 (98.9, 100.0) | 93.6 (91.3, 95.9) | 88.2 (85.2, 91.2) |
| Avid (125 kHz) | 75.0 (71.0, 79.1) | 98.2 (96.9, 99.4) | 95.9 (94.1, 97.8) | 92.1 (89.5, 94.6) |
| Home Again (125 kHz) | 66.4 (62.0,70.9) | 97.3 (95.7, 98.8) | 95.6 (93.8, 97.6) | 97.0 (95.4, 98.6) |
| AKC (128 kHz) | 98.9 (97.9, 99.9) | * | 95.2 (93.2, 97.2) | 97.0 (95.4, 98.6) |
| Bayer (134.2 kHz) | 95.9 (94.0, 97.8) | * | 94.8 (92.7, 96.8) | 98.4 (97.2, 99.6) |
| Home Again (134.2 kHz) | 96.8 (95.2, 98.5) | * | 98.4 (97.2, 99.6) | 98.4 (97.2, 99.6) |

* Does not detect

Study Support

The microchip studies^{3,4} were funded by (in alphabetical order) American Animal Hospital Association, American Kennel Club Companion Animal Recovery, American Society of Veterinary Medical Association Executives, Bayer HealthCare LLC, Schering-Plough Home-Again LLC, and the Society of Animal Welfare Administrators.

The six participating shelters in the microchip studies were the Animal Protective League (Cleveland, OH), Charlotte-Mecklenburg Animal Control (Charlotte, NC), Dumb Friends League (Denver, CO), Humane Society of Broward County (Fort Lauderdale, FL), Maricopa County Animal Care and Control (Phoenix, AZ), and the Michigan Humane Society (Bingham Farms, MI).