Equine Identification: The State of the Art

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Introduction
Since the dawn of civilization, human beings have sought ways to identify the animals they own in order to differentiate them from animals owned by others. In the United States, early equine identification consisted of a word description or graphic sketch of the animal. Hot iron branding, introduced by Spanish settlers in the early 1800s, was adopted chiefly by ranchers in the western states. Lip tattooing came into use in the late 1800s—first, in the U.S. Army, replacing the hot iron (Preston) brand, and subsequently in the tattooing of race horses (then called “speed horses”) at racetracks.

The need for permanent, easily proven equine identification is a basic one throughout the equine industry. Yet the standard methods of horse identification and associated recordkeeping currently in use are too often rudimentary and fragmented.

Reliable horse identification becomes especially critical in emergency situations. Lessons from Hurricane Andrew demonstrate that lack of permanent identification leads to theft and confusion over ownership as horses stray, are evacuated, or are otherwise separated from their owners. Horse identification is also important during outbreaks of serious infectious disease, as officials seek to ascertain which horses traveled where as well as to identify horses that may have been exposed to disease.

Electronic Identification of Equids
Electronic identification (EID) of horses and other animals utilizes implantable transponders, which are activated when interrogated by radio frequency readers known as radio frequency implantable devices (RFID). RFID readers are used to identify and display a transponder’s alphanumeric characters. The passive role of the microchip gives it durability throughout the life of the equid.

Field trials in horses between 1985 and 1990 revealed that transponders, typically the size of a grain of rice, were easy to implant with a 12-gauge needle. The trials also demonstrated that biocompatible glass could be implanted safely in horse tissues with little or no tissue irritation. Although tissue migration problems were encountered initially, it was found that adding an antimigration cap to the transponder solved these problems.

Microchips are implanted in the left side of the neck/nuchal ligament, the U.S. Department of Agriculture/Food and Drug Administration-approved anatomical implant site for all equids in the United States. The International Standards Organization has established a unifying standard for equipment produced by all major electronic identification and RFID manufacturers. A universal reader/scanner is available and has been introduced into the marketplace. It is expected that such scanners will be more broadly available in the near future. All scanners will need to meet ISO standards.

In the United States, the State of Louisiana’s Equine Infectious Anemia Control Program provides a good example of the successful application of implantable RFID methods. Electronic ID as a form of permanent identification has been found to
be very practical and is given much of the credit for reduction of equine infectious anemia (EIA) in Louisiana. To date, implantation has occurred in approximately 100,000 equids in the state.

RFID is an impartial method of equine identification that can be used in concert with natural markings, age, gender, breed, and hair-coat color as well as any existing human-made brands, marks, and scars. With the rapid growth of technology, the role of computers in business and veterinary practice has become very important. RFID is a practical and computer-compatible method of identifying horses and other equids.

Integrated Circuitry (IC) Cards

Identification, whether via natural markings, brands, tags, internal RFID, or algorithmic code derived from the iris or retina, is no more than a “license plate” that makes the bearer unique. Relative to the individual, such efforts are valueless; the value of identification is in the differentiation of one subject from all others. For modern horse owners, livestock management requires more data than can be accessed reliably via the human memory. Complex issues such as breeding management, national and international movement, and diagnostic, therapeutic, show, race, and pull recordkeeping require data security, instantaneous data access, and data transferability beyond the capabilities of a memory-or paper-based system.

Integrated circuitry (IC) cards, or “smart cards,” meet the requirements of modern livestock recordkeeping. These devices incorporate any desired information into the animal’s unique identification and store this information on an IC chip built into a card that resembles a credit card. The card, retained by the owner or custodian, can be accessed only by people using a second authorization card. These devices may be used in the local management of the animal or herd by an owner, custodian, trainer, veterinarian, or other authorized person. The cards also may be connected via the Internet to the facilities of regulatory agencies, breed associations, show offices, or other professional affiliates.

IC cards can be used as authorization/ID cards, complete with photos and other information on one or both surfaces, for employees or service providers in secure areas such as race tracks, the offices of regulatory agencies, and medical care facilities. IC card-based record systems offer all of the benefits of modem digital systems, including security; immediate access by authorized persons, both locally and through computer network systems; voluminous and flexible data storage; and attractive pricing. IC card technology fits seamlessly into systems in use or under development for paperless regulatory testing and health certification. It provides benefits such as simplicity, accuracy, timeliness, and affordability.

Biometric Methods of ID

Biometric identification technology involves the “measurement” of a “biologic” feature for purposes of differentiating accurately among multiple biologic subjects. In human technology, common applications currently include retinal scans, iris scans, and scans of facial characteristics. With respect to horse identification, retinal scans currently are probably not feasible because of the difficulty of obtaining an image of a horse’s retina. Iris scans, however, are expected to be very useful. Iris scans use common digital technology for analysis by algorithmic processing computer programs. The resulting output, termed an “iris code,” contains approximately 512 bytes of data. An iris code can be stored in a database and used for subsequent identification of a subject. The technology has been determined to be quite accurate in humans and is being used commercially for a variety of security purposes, including computer login control.

Necessary equipment includes a digital camera for iris image acquisition, a PCI card frame grabber to transport the digital image from the camera to the computer, and a special processing card for algorithmic analysis of the iris image. The remaining computer system provides data management and storage.

The probability of two human irises producing exactly the same iris code is 1 in $10^{76}$ power. The process of identifying an iris using a large database of iris codes requires only 1–2 seconds. Currently, the digital capture device needs to be 2–3 inches from the iris. However, various optic arrangements may increase this distance.

ID Programs for Theft Prevention

Many programs have increased public awareness of horse theft prevention by encouraging horse owners to identify their horses and by calling for stepped-up inspection at equine abattoirs. The Handbook of Horse Theft Prevention, published in July 1999 by Bloodhorse Publications, provides comprehensive information on methods of horse identification and theft prevention. All royalties from the sale of this excellent resource are contributed to the AAEP Foundation.

References and Notes


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