Traceability of domestic carnivores in France

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Summary
The traceability of domestic carnivores facilitates the monitoring of such animals for health purposes and for the management of suspected contagious diseases. A traceability system can also assist in the detection of fraud, lost or stolen animals, and in finding owners. To be effective, a system for the ongoing monitoring of these animals and their movements is required. Marking domestic carnivores is insufficient; a reliable identification system, with adequate guarantees of functioning, must include procedures to monitor the assignment of identification numbers, the marking methods (tattooing or electronic identification), in addition to the printing, issuing and registration of identification cards and the computerised management of data regarding the animals and changes of address or owner. The equipment used in the identification procedure must be well understood and employed correctly so that the identity of the animal is clear to all and verifiable by the appropriate authorities. The equipment must therefore be subject to approval, and must meet pre-defined specifications. For these reasons, France has adopted certain measures, including the establishment of a national register, the compulsory compliance with ISO 11784 and 11785 standards, and a transponder identification number including the country code (250 for France), the species code, and the identification code of the manufacturer.

Keywords

The concept of traceability
‘Traceability’ is the ability to trace the history, application or location of an entity by means of recorded identifications (3).

To ensure the traceability of an animal, an information system (identifying the animal) with sufficient capacity to compile all records to be traced is necessary.

For a reliable system that provides genuine traceability, the entire data circuit must be analysed, as well as the modifications to data that are required. The constraints inherent in the transfer of data (the possibility of recording incorrect identification numbers or other information), must be considered, as well as the accuracy of data compared to the actual characteristics of the traced animal (e.g. location or physical characteristics). Any modification concerning an animal or product must be recorded and analysed to determine the potential errors that may lead to a loss in traceability (analysis of critical points), and to propose methods of reducing the risk to the greatest extent possible.

Uses of identification
A traceability system requires prior identification of the animals to be traced.

Animal identification is not synonymous with marking. Identification is a much more comprehensive process which includes the assignment of an identification number, the act of marking, the establishment of an identification document for the animal and the registration of this document in a central
A national identification system serves to maintain a record of animals present in a country, but also to facilitate intervention with respect to the party responsible for an animal when a health-related incident occurs, to locate the owner of a lost animal, or to act on claims of theft or disappearance of an animal. To meet these goals, the existence of a central identification registration system is important, to answer queries from the public or law enforcement officers who need to identify an animal or find the owner of an animal.

Identification of dogs by means of tattoos

To implement an effective identification procedure, the different available marking techniques must be considered. In addition, the field operations and the operational management of the identification register must be organised. Furthermore, a regulatory framework must be established, such that the owners of domestic carnivores are made aware of their responsibilities, rights and duties as well as of the penalties faced if a regulation is violated.

Since the creation of genealogical records of canine breeds in France, in 1971, the identification and registration of those animals that could be covered by such records has been necessary. The marking system introduced was tattooing, performed on the right ear or the inner side of the right thigh, using either a tattoo marker or a dermatograph.

Satisfactory conditions must be provided for the marking operation, which requires an authorised tattooer. If the tattooer is not a veterinarian, only a tattoo marker may be used.

To enforce marking standards, a commission has been set up to examine any complaints or requests to suspend or withdraw authorisation granted to a tattooer, whether or not the latter is a veterinarian.

To make allowance for differing ear sizes amongst dog breeds, the identification number must be standardised, and the tattoo size limited. In 1971, on the basis of a tentative estimate of the number of animals to be identified, a code comprising three letters and three figures was chosen. Following the enactment of the law on dangerous animals (1), which stipulates that any dog born in France after 6 January 1999 must be identified before the age of four months and that any animal given away or sold is subject to prior identification, the increased demand meant that an additional figure had to be added to the identification number.

Before an identification may be tattooed onto a dog, the authorised tattooer must apply to the national registry authority for a tattoo identification card. Thus, the identification numbers used on dogs in France and the activities of the authorised tattooers can be monitored.

On 16 February 1971, the Société centrale canine, an organisation responsible for the improvement of dog breeds in France, was authorised to manage the national register.

After tattooing an animal, the authorised operator must complete the identification card, provide a copy to the owner, and send another copy to the national registry authority within eight days (Fig. 1). The authority then verifies, registers and files the document.

To facilitate action in the event of loss or theft, or the discovery of a stray dog, any change of address or owner must be reported by sending Part B of the identification card (Fig. 2) to the national registration authority. The registration authority records the change of address or owner, issues a new identification card indicating the new address or owner, and sends this to the person concerned. An agreement with the postal authorities allows Part B of the identification card to be sent to the registration authority without additional payment. In exchange, notification of any such change is compulsory, and failure to report a change is an offence (4th-class sanction) (Fig. 3).

Identification of cats by means of tattoos

In the 1970s, as a result of rabies control measures, the need arose to identify and register cats prior to vaccination. The tattoo is placed on the inner side of the right ear or, when that is impossible, on the inner side of the left ear.

Given the nature of these animals, marking must be performed by a veterinarian using a dermatograph.

If a veterinarian is suspected of committing a marking error, the case is examined by a commission, which may suspend or withdraw the authorisation of the veterinarian to perform tattoos.

The identification procedure for cats is identical to that described above for dogs (Fig. 4). The identification number contains two or three letters and three figures.

The authority responsible for the national cat identification register is the national union of veterinarians in private practice (Syndicat national des vétérinaires en exercice libéral [SNVEL]).

With regard to reporting changes in address or ownership, cat owners enjoy the same postage exemption, and are subject to the same obligations as dog owners (Fig. 5).
**Fig. 1**

**Dog tattoo identification card**

Section to be returned to the dog tattoo registration authority

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**Fig. 2**

**Dog tattoo identification card**

Section remitted to the owner, consisting of Parts A and B. Part B is used to report changes of address or ownership to the dog tattoo registration authority.
Experiments with electronic identification

In parallel with national and international discussions on standardising the characteristics of transponders and the reading thereof, the authorities in France held technical consultations with representatives of veterinary practitioners (SNVEL) in 1996, and decided to study the feasibility of electronic identification.

In 1997, the Ministry of Agriculture and Fisheries commissioned the SNVEL to conduct experiments with this procedure (including the management of a central register).

Given the many potential uses of identification (recovery of lost or stolen animals, prevention of fraud, and protection of animal and public health), before authorising a given marking procedure, all the relevant information must be assessed and, on that basis, effective regulatory measures can be decided upon.

Amongst the points that deserve special attention are the capacity and range of the readers, the possible environmental disturbances brought about by electromagnetic fields, and potential fraud by removal of markers.

Following the publication in October 1997 of an enforcement decree covering eight départements in France, field experiments were conducted from April 1999 to January 2000. Five manufacturers, who had applied for the authorisation of their equipment, and 323 veterinarians participated.

Equipment used

To ensure that the transponders and readers used were standardised, the Ministry of Agriculture and Fisheries decided that only equipment meeting the standards ISO 11784 and ISO 11785 of the International Organization for Standardization (ISO) would be used for identification by radio frequency (4, 5).

Fig. 4

Cat tattoo identification card
Before being submitted to the veterinarians, all transponders were tested by the SNVEL, which was given responsibility for conducting the experiments. Random checks were also performed on the readers.

**Methodology**

The transponders were inserted in the left jugular groove of the domestic carnivores.

The experimental results, as presented below, were obtained from the individual or summary reports sent by veterinarians, and from a study performed by the École vétérinaire d’Alfort.

Each veterinarian taking part in the experiments received thirty transponders (six from each manufacturer) as well as instructions for the implantation of the transponders and for the transmission of data obtained. In total, 6,500 transponders were implanted by the 323 veterinarians.

According to the protocol, the veterinarians made a reading of the transponder before implantation, after implantation, and undertook controls after eight days, one month and six months.

In total, 6,225 individual reports (a 95% return rate) and 250 summary reports (a 77.3% return rate) were transmitted by the participating veterinarians.

The study performed by the École vétérinaire d’Alfort consisted of a series of tests *in vitro* to determine the operational characteristics of the transponders and readers used in the experiments. The tests concerned collision effects, the influence of electromagnetic fields, and the range for each transponder/reader pair.

**Summary of results**

**Tests of equipment upon receipt**

Preliminary testing showed that four transponders were not readable, and that twenty-five had an unacceptable code, which gave a rejection rate of 0.3%. Regarding the readers, two were defective and ten had to be replaced in the course of testing, giving a rejection rate of 1.2%.

**Collision phenomena**

Reading distortions (silence in one of the two transponders, reduction of the range by 2 cm to a few millimetres, depending on the transponder/reader pair) may occur when two transponders are implanted in the same animal and become positioned in parallel and the implantation distance is below a certain threshold (2-5 cm), which is specific to each transponder.

**Influence of electromagnetic fields**

Cellular phones and high-voltage lines do not seem to affect the reading of the transponders. Only the presence of a computer monitor, at a distance of 40 cm or less, caused interference.
Performance in vivo
Maximum migration at one month was 5 cm.

Only one transponder of the 6,500 implanted was expelled.

Variation of reading quality according to time since implantation
Reading was successful for 98% of the transponders immediately after implantation, eight days and one month later. The success rate was 96% six months later.

Range
The range was evaluated on the basis of readings taken at the time of implantation.

The range was not affected in cases where the reader and the transponder were made by a different manufacturer.

The ranges are detailed in Table I.

Cases of non-reading were due to transponders that did not emit a signal, with or without migration.

Table I
Evaluation of transponder readings at different distances

<table>
<thead>
<tr>
<th>Reading distance</th>
<th>Transponders read (%)</th>
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<tbody>
<tr>
<td>Less than 5 cm</td>
<td>96-98</td>
</tr>
<tr>
<td>5 to 9 cm</td>
<td>44-54</td>
</tr>
<tr>
<td>More than 10 cm</td>
<td>2-22</td>
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Analysis of the experiments

Transponders and injectors
The rate of defective transponders confirmed the importance of inspection before distribution.

A ready-to-use system presents clear advantages.

Readers
Careful consideration of the operating characteristics of the readers may prove worthwhile, as users found certain models to be inconvenient. Variability in reading methods (in some cases the button had to be held down, in other cases not) may lead to reading errors, and certain models were not ergonomic (too heavy, for instance).

Certain animals may react aggressively to the sound emitted when the reader is used. The possibility of inactivating this sound should be provided.

Site of implantation
The site of implantation recommended for the experiments was the left jugular groove.

Given the proximity of this site to the left jugular vein, other implantation sites were suggested, namely:
– the tip of the sternum on the left side
– the base of the left ear (although the animal is very likely to scratch itself here)
– the inter-scapular zone (this is the site used in the United States of America, although it is also a frequent site for therapeutic injections).

Based on recommendations by professional organisations in Europe and the ISO, the most commonly-used site remains the jugular groove.

Variability in transponder readings, especially range
The experiments confirm that reading ranges are low, generally less than 5 cm (Fig. 7), which could discourage certain professionals from using the procedure.

Fig. 7
Electronic identification of a domestic carnivore
Photo: courtesy of La Dépêche vétérinaire

Manufacturers must be made aware of this problem, and encouraged to increase reading ranges. Nevertheless, the capabilities currently available are compatible with the expected uses.

System security: transponder code requirements
In addition to the constraints of the ISO 11784 and 11785 standards, which provide a comparable level of reliability for all equipment used, as well as compatibility between all readers and transponders, the identification code structure must be defined and compliance with this structure guaranteed. The code is composed of the country code, the species or species group code and a national identification code.

Testing confirmed the need for an independent expert to monitor the products proposed, and for an authorisation procedure to verify compliance with identification code requirements and ISO standards.
System security: distribution
Monitoring and traceability of the equipment used is essential. This can be achieved by sending the transponders and the pre-printed identification documents together. This means that the equipment is first approved by the authority responsible for electronic identification, which can thus ensure verification and traceability down to the veterinarian authorised to perform identification.

General conclusions
The results of the trials indicate the need for official recognition of electronic identification, while leaving the owner free to use, and the veterinarian free to advise, other approved methods (such as tattoos).

Where two identifiers coexist, for example a tattoo and an electronic chip, a link must be created between them, and the two identifiers should be recorded on the same identity document.

Users must be free to choose the equipment, provided it is approved and meets the essential technical requirements.

The equipment must meet ISO standards, and be subject to verification by an independent expert, both when authorisation is granted and in the course of use.

Technical recommendations regarding readers would also be useful, especially with respect to reading range.

Inserting an electronic implant (Fig. 8) is a medical act, since it implies crossing the cutaneous barrier (2), and may require anaesthesia. The procedure may be performed only by a veterinarian (Fig. 9).

Establishment of an electronic identification procedure for domestic carnivores
In view of the results of experiments on electronic identification, the Ministry of Agriculture and Fisheries decided to draft national regulations governing the use of the electronic identification procedure for the official identification of domestic carnivores.

These draft regulations will include the following recommendations, aimed at ensuring the quality and traceability of the equipment used:

– equipment must meet the ISO 11784 and 11785 standards
– initial authorisation of such equipment must be granted by a laboratory assigned to perform tests to verify compliance with the relevant ISO standards, as well as with some additional technical specifications
– the authorisation is subject to periodical review by an independent expert
– a national register must be established, containing all information concerning the electronic identification of each domestic carnivore, and the corresponding approval of the authority responsible for managing the register.
– the above-mentioned authority must verify that the identification codes for equipment made available to veterinarians comply with code definitions, and that the transponder and the pre-printed identity card (containing the transponder number) are distributed together

– a link between the different registers must be created when an animal has two types of marking (tattoo and transponder)

– procedures must be established regarding the identification of domestic carnivores from other countries that remain on French territory for more than three months.

The owner of a domestic carnivore shall be able to choose, for identification purposes, between a tattoo and an electronic implant.

To ensure compliance with technical recommendations, specific regulations will specify procedures for manufacture, authorisation, marketing and use of electronic identification equipment, as well as sanctions that apply in the event that such regulations are violated.

References


