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Reliable identification of cattle

First results from the application of different transponders in IDEA project

Within the IDEA project three different types of transponder have so far been used in the identification of around 30 000 cattle. Current results indicate a high dependability for this identification media. The required reading equipment (stationary and mobile), however, do not at the moment completely fulfil the practical farming demands for dependable automatic identification of cattle.

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Keywords

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Under the omens in the BSE discussions and to the background of imminent further expansion of the EU, the reliable identification of cattle is of steadily growing importance. Up until now, identification featured plastic earmarks which had to be visually recorded. For some time now various forms of electronic identification have also been available. These are called transponders but are not yet recognised as official identification means for cattle. The decisive advantage of this new technology lies in the automation possibilities at all production stages where identification is important. Linked with this is a higher security for registration and increased efficiency in the entire administration of the animal identification numbers. Required is a standardised technology which allows transponders to be applied throughout the production chain from dairy farm over beef producer to slaughterhouse. With this in mind, two important international standards were already established in 1996 in order to fundamentally fulfil these requirements. Thus, ISO 11784 regulated the clear coding of the numbers and ISO 11785 the technical parameters of data transmission. Further, within the data transmission norm are permitted two technically different systems – FDX (Full Duplex System) and HDX (Half Duplex System).

Presentation of IDEA project

Within the EU project IDEA, cattle from chosen farms between April 1999 to the end of 2001 are being electronically identified to test the functional efficiency of ISO compatible transponders and their operation in practical conditions. Only allowed in the test are transponders and transponder-readers which have previously successfully passed a test procedure set by the EU Joint Research Center (JRC). Featured in the German part of the project were an injectable transponder, electronic earmarks from three different manufacturers and a bolus variant with integrated transponder (*table 1*). Also tested for functional control were mobile hand-held readers. The electronic identification used in each case were inclusively types (injected, earmark, bolus) marked in the official cattle passport. Thus the necessary information flow can be continued with the animal in the slaughterhouse. Both numbers involved (VVVO-number and transponder number) were also recorded in a specially developed software together with other information in a PC and transmitted to the IDEA data bank on a weekly basis. All transponders were checked for functionality at defined intervals so that eventual malfunctions could be documented. In this relationship special importance was given to testing functionality and securing of the transponders in the slaughterhouse in that this aspect represents a crucial point in proving identity in the trials and in later practical conditions. Currently a total of six commercial slaughter companies are involved. Data are collected there and also sent to the IDEA databank.

Animal identification

Fitting livestock identification transponders is done by schooled personnel. Up to end of December 2000, a total of 31 000 animals were thus identified as part of the project (~12600 injection, ~10800 electronic earmarks, ~7600 boli). Site of transponder attachment depended on the transponder variant. Injected transponders were put into the scutulum of the left ear which had proved

Table.1: Overview on transponders used in the IDEA-Project

Description	Type	Transmission system
Injectable transponder	TIRIS 23 mm	HDX
Electronic earmark	Nedap Ear Tag D 40	FDX-B
	Allflex Standard Ear Tag	HDX
	Diehl Daisy DTE 530	FDX-B
Bolus transponder	Allflex ceramic bolus	HDX

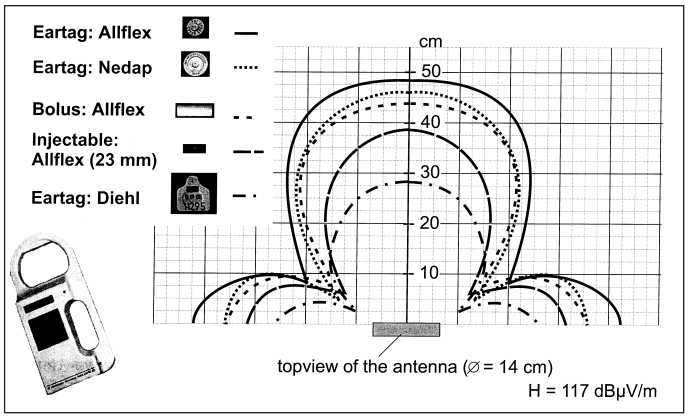

Fig. 1: Interrogation field of different transponders in front of a full ISO hand-held reader in optimal orientation (0°) under lab conditions (ISOMAX III, Datamars, Switzerland)

practical in previous tests [1, 2]. Sterile and individually packed transponders are available for this method. According to evaluation data up until now, time required for each injection is well under a minute. More time-consuming is the separation and holding of individual animal for which normally a second person is required. Electronic earmarks are also fitted into the left ear. This work can be handled by one person although it is often supported by a second. Applying boli with an applicator requires immobilisation of the animals as with injections. The bolus is swallowed and lies in the reticulum so that it can then be read from the left side of the animal. An advantage here is that this method of applying identification is "bloodless". The reading of the bolus code after insertion has, however, proved time-consuming in practice. This can only be done when the animal has completely swallowed the bolus so that in some cases there can be a delay of several minutes.

In some cases problems have occurred with the injection method and with the bolus alternative after application. With two from 12 600 animals an infection had to be treated after injection of transponders. With the bolus, application actually led to the death of three from 7 600 animals at an age of from 40 to 84 days whereby perforation on the oesophagus was afterwards diagnosed.

First results on reliability

The results regarding functional security come from the testing of the electronic identification with livestock. Mobile readers, for identifying transponder codes, were used for this. The instruments available at the moment have a reading distance of from 20 to around 50 cm. *Figure 1* shows the typical working distance for the reader, and the recognition field with the transponders used in the IDEA project in combination with the reader "Isomax III" from the company Datamars. Although this instrument had a better reading distance in comparison with the second reader in practical use (Gesreader II ISO, firm Gesimpex) there occurred in practice uncertainty in identification. Practical users complained that with neither of the instruments could a reliable identification of bolus animals be achieved. Consequently, in the field, no clear difference could be attributed to the characteristics "transponder not readable" and "transponder not working". As a result, the data collected in the field regarding breakdown rate of transponders in part was only able to be finally confirmed after their collection in the slaughterhouse. Provisional results show in total a very low loss rate of under 1% for all three transponder variants. However, with one of the three electronic earmarks mechanical weakness occurred so that in some cases the electronics broke out of the plastic mark. Experience so far indicates that four from five of the applied variants showed a high to very high reliability. Detailed information on these subjects will only be available after a still greater number of animals are slaughtered.

Data collection in slaughterhouse

The target means for the identification via transponder in the slaughterhouse was a static reader. But in the application of the project hand-held readers had to be used because in the tender period only one certified static reader was available for reading HDX and FDX transponders. Own preliminary trials did indicate, however, that the instrument could read HDX transponders at a substantially further distance (50 to 80 cm) than possible with FDX transponders (0 to 60 cm). In order to secure a reliable identification for all working transponders, hand-held instruments (Isomax I, firm Datamars) continued to be applied. Even with smaller reading distance capability (~30 to 50 cm), the readers gave reliable identification in that they could be held nearer to the transponder site. For slaughterhouse identification, however, stationary readers will be required in the medium term in order to allow the necessary degree of automation on the slaughterline.

Outlook

The reliability of identification which is necessary for the total electronic animal identification method can, according to experience, so far basically be supplied by all three variants (injection, electronic earmarks and bolus). To be noted is that, because of Bavarian marketing conditions, mainly feeding beasts with a weight of over 80 kg have been identified within the IDEA project. Because of anatomy characteristics there may be limits, however, in the application of boli or injected transponders with very young animals. The results of the field trials did highlight some weak points, however, with the readers so that the existing potential of identification atomisation is not able to be fully exploited currently. Further developments are necessary, especially regarding stationary reading equipment where FDX and also HDX transponders are to be reliably read. Regarding application location (injection and earmark at head, bolus in reticulum) the installation of stationary reader antennae must be appropriately controlled.

Literature

Books are signified with •

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