

Electronic animal identification and organic farming

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Abstract

Traceability of meat and meat products is becoming increasingly important to consumers and producers, especially with regard to strengthening domestic and international customers' confidence in the integrity of organic producers and products. The electronic identification of animals (eID) has gained in importance over the last years. Its implementation on a wider scale (obligatory and voluntary official animal identification) will improve the current traceability system for animals and food products (e.g. beef) by making it faster and more accurate. The implementation of eID is being discussed controversially, mainly because direct costs and benefits are not balanced along the production chain.

For the past five years electronic animal identification has been the focus of a number of research projects at vTI (formerly FAL) including a cost-benefit analysis of cattle eID in Germany, the tolerance of eID devices in goats and additional benefits of eID (e.g. transponders with integrated temperature sensors).

Key words: electronic animal identification, organic farming

Introduction

The electronic identification of animals (eID) has gained in importance over the last years. It is used worldwide in a wide range of species including productive livestock, pets, zoo animals, endangered species and wildlife. It is becoming increasingly important as an obligatory official animal identification in more and more countries because of the associated benefits resulting from this form of animal identification.

Depending on the animal species the electronic device can be an electronic ear tag, a bolus, an injectable transponder or an electronic mark on the pastern (leg band).

In cattle mainly electronic ear tags and in some cases boli are used. For small ruminants (sheep and goat) electronic ear tags, boli and in some countries leg bands are available. In equine and companion animals an injectable electronic transponder is the method of choice. The injectable transponder is not yet available for productive livestock because of the difficulties in recovering it after slaughter (European Union, 2012a; Schwalm et al., 2009).

Electronic animal identification: worldwide

In cattle the ISO-conform eID is obligatory for example in Canada, Australia, Uruguay, Botswana and Denmark. Many countries at least support a voluntary eID in bovine animals such as Argentina, European Union, Japan, South Korea, Brazil, Mexico, New Zealand, USA (for detailed references see Schwalm and Georg, 2011). The European Commission is currently exploring the possibility of introducing electronic identification as an official method to identify bovine animals within the EU on a voluntary basis. Electronic identification can contribute to improvements in existing systems of cattle identification. (Europäischen Union, 2012b).

Sheep, goats and equine have to be electronically identified in die EU. There are obligatory eIDs also in the pet sector. For example pets have to be chipped when they travel in the EU (starting in

2012) and for import in many countries worldwide (for detailed references see Schwalm and Georg, 2011).

Electronic animal identification: ISO-standards and database

In the light of global trade it is necessary to optimize the use of eID worldwide; therefore, it is essential to have international standards concerning eID of animals. ISO (International Organization for Standardization) is a global network that develops and publishes International Standards. For an overview concerning ISO-standards eID see Schwalm and Georg (2011).

The structure of the RFID-dataword for animals is described in ISO 17784. Within ISO 3166-1 each country has a three-digit country code (e.g. Germany 276). When the country code is used the legal authority must ensure uniqueness of animal identification codes. A country, which does not have a competent authority allocating identification codes may only use manufacturer codes. In the case when the manufacturer code is used, each manufacturer is responsible for ensuring the uniqueness of their codes. ICAR (International Committee for Animal Recording) registers the manufacturers that are allowed to use a (shared) manufacturer code. (Hogewerft et al., 2008)

Table 1: RFID-dataword for animals (ISO 11784)

Bit-Nr.	Number of digits	Information
1	1	Flag animal/non animal application
2-4	1	Retagging counter
5-9	2	User Information field
10-14	2	reserved
15	1	Flag indicating advanced transponder
16	1	Flag indicating data block
17-26	4	ISO 3166-1 numeric country code
27-64	12	National code of identification

For animal identification two types of databases are relevant. First a database for animals: For tracking and tracing of animals databases are used. In these databases individual animal identification is linked to owner information and possibly other information. The owner of the database can be a government or private organization. A country may use several databases e.g. one for companion animals, one for pigs, one for sheep, one for goats, another for cattle etc. Different organizations can be responsible for different databases (Hogewerft et al., 2008).

Second a database for RFID tags compliant with ISO 11784 and ISO 11785: The allocation of ID-codes must be registered to eliminate the risk of identical identification codes for different animals. When the manufacturer code is used the manufacturer must install and maintain such a database. When the country code is used the legal authority must ensure uniqueness of animal identification codes (Hogewerft et al., 2008).

Electronic animal identification: pro/con (organic farming)

The precondition for traceability is the collection, verification and availability of relevant data without delay, to ensure quality, origin and disposition of the products over the entire value chain. With eID animals can be identified quickly and automatically. EID in combination with a central database will provide a consistent traceability of animals from birth to slaughter. This means that in the case of an animal disease outbreak, electronic identification provides a clear link to the history of each individual animal allowing quicker and more effective action to be taken to eradicate or prevent the spread of infectious diseases. (European Union, 2012c)

With eID manual transcription errors can be eliminated even in downstream sectors such as transport, slaughter and marketing. One keystone of organic farming is the consistent certification of organic origin, rearing and husbandry of livestock. The potentials of eID can be fully used and are the precondition for the compliance with maximum safety and quality standards within the production of animal and food products.

Apart from the traceability benefits, electronic tagging can also be a very useful tool for on-farm management. Increasing herd sizes must not lead to a decrease in individual animal caring. The automatic animal monitoring on an individual basis is becoming increasingly important. EID is the basis to record animal individual data on a large scale (Hartung, 2005). Through optimizing animal management and through better recording, detecting and fulfilling individual animal needs, eID can lead to an improvement in animal welfare. This aspect is consistent with one of the main goals of organic farming, animal welfare.

In calf and dairy management, for example, integrated systems with sensors detecting performance and health parameters are used (Platen et al., 2007; Hartung, 2005). (Thus needs-based individual feeding and monitoring is possible.

Finally, it may bring benefits to farmers and other stakeholders as it will reduce the administrative burden through the simplification of the current administrative procedures. (Europäische Union 2012c).

The implementation of eID is being controversially discussed, mainly because direct costs and benefits are not balanced along the production chain. Costs are mainly born by the animal keepers (farmers) at the holding of birth while most of the eID benefits seem to affect the downstream actors (markets, slaughterhouses).

Electronic animal identification: vTI- projects

In a study on the introduction of electronic animal identification (eID) by electronic ear tags in cattle in Germany a questionnaire was given to experts and a cost-benefit appraisal was calculated. It turned out that the farmers are holding a positive view of eID, since they are expecting synergy effects. Model calculations indicate that the ensuing costs will be reasonable. Farmers, who do not want to use eID, only pay the cost of the electronic eartag (Georg et al., 2008 a,b).

The objective of our studies concerning the additional benefits of eID was the evaluation of injectable transponders with temperature sensing option in cattle and goats. At this point not all difficulties have been solved, such as the effect of the injection point and the environmental temperature on the measured temperature in comparison with the rectal temperature. (Georg et al., 2009, Ude et al., 2011)

Another study concerned with the evaluation of an early identification of goat lambs while grazing with electric netting and hedges. Four different types of ear tags were tested in 115 lambs. Only a few inflammations of the ears were observed. Only one loss of ear tag was observed and the functionality was 100 %. The electronic identification with ear tags can be recommended for goat kids starting at birth (Ude et al., 2010; Bender et al., 2011).

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Sonderheft 362
Special Issue

Tackling the Future Challenges of Organic Animal Husbandry

2nd Organic Animal Husbandry Conference
Hamburg, Trenthorst, 12-14 September, 2012

Gerold Rahmann and Denise Godinho (Eds.)

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the German National Library**

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Publikation in der Deutschen Nationalbiblio-
grafie; detaillierte bibliografische Daten sind
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abrufbar.



2012

Landbauforschung
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Preis / Price 18 €

ISSN 0376-0723

ISBN 978-3-86576-094-4