ELECTRONIC IDENTIFICATION AND MANAGEMENT OF CATTLE

Pedro Paulo Pires

Embrapa Gado de Corte
Br 262, Km 4 - Vila Popular - CEP 79 002 970
Campo Grande, MS, Brasil
Fone: 55 67 368 2084, fax: 55 67 368 2150
e-mail: pppires@cnpgc.embrapa.br

Abstract

Nowadays, the intensification of precision animal science; the use of genetic improvement and herd management programs; the need of a strict ownership control allowing the traceability required by the National Program of Meat Certification (SISBOV) imply in the need of the correct and immediate identification of cattle. Embrapa developed an electronic device that allows animal identification by radio-frequency. As this identification allows the recognition of animals on pastures, it can also be used to increase production, as it allows the accurate control of the herd. Economic advantages resulting from daily weighing for evaluation of herd performance were verified. With automatic identification, daily weighing can be made on the field, with no worker's interference. Animals are automatically weighed when they are moved to the feeding troughs. These weight measurements will be analyzed and compared to those collected in two-months periods. The performance of each animal can be more rapidly and reliably known, allowing to make decision that increase production.

Keywords : electronic systems, traceability, identification, management, cattle.

1 History and justification

In order to make cattle identification easier, telemetry can be used. Distance-activated electronic implants emit an electro-magnetic signal with the animal number. This signal is received by a computer system, which rapidly and unquestionably checks the presence of the animal in that herd (identification by radio-frequency) (Geers et al., 1997).

Telemetry meaning has changed in the last few years. The original specification was the remote measurement of organic and biological parameters, such as electro-cardiograms, electro-encephalograms, pH, body temperature, blood pressure, muscle contraction strength, physical activity, blood flow, and other physiologic parameters (Hansen et al., 1983).

The current definition does no longer include data transmission by light, radio or sound waves, or transmission distance. Biotelemetry includes the concept of access and/or control of measurements with no interference or noise of an animal or human organism. Thus, biotelemetry includes the concept of biomedical instrumentation, allowing the transmission of physiologic information from an usually inaccessible location to a remote monitoring site, always through micro-instrumentation techniques (Hansen et al., 1983).

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University of Contestado - UnC - Concordia Unit - Concordia - SC - Brazil
Embrapa Pantanal - Corumba - MS - Brazil

The access of physiologic parameters by telemetry included the measurement of these data with the aid of transponders or electronic transducers or sensors followed by digital or analogical processing.

Electronic systems that can completely implanted in the body of animals have evolved in the last 30 years from simple transmitters to an ultra-intelligent sensor with interface systems (Goedseels et al., 1990).

Transponders or 'electronic tags' are distance-activated by transmitters-receptors that use a pulse-echo principle of about 132 KHz. These methods are mainly used for identification, and their transmission occurs only in response to a previous stimulus (Blackburn, 2001). The basic system consists of a transmitter/receptor and one or more transponders. In pilot projects developed in Embrapa Gado de Corte since 1996 (Pires, 2000), we arrived at the following conclusions:

1.1 As to methodology of identification with subcutaneous or intra-ruminal implants

1. The used transponder must be covered with a bio-compatible substance, which does not leave residues in the meat, and also be resistant to breaking due to impact or pressure from routine management procedures;
2. It must be sufficiently potent to be 'read' up to a distance of 1.5 meters and with the animal running at a speed of 40 Km/h;
3. It must be easy to implant and must be placed in the animal body from where it does not 'migrates', allowing reliable reading, and also must be easy to recover at slaughter (cul-de-sac of the navel and stomach);
4. The transponders must be 'reading only' or 'single set' type in order not to allow number changes; and
5. Both transponders and readers, stationary or portable, must be ISO-compatible, i.e., any reader, independent of brand or model, can read the transponders.

Due to the inclusion of these devices in the carcass, this equipment can be considered as additives, and therefore, must be regulated by a special legislation, and this has made the use of this process difficult.

International Norms ISO 11784 and ISO 11785 established both the technical concept of electronic identification of animals and the used code structure.

Several studies report that the site used for transponder implant in the body of cattle is the base of the ear. However, in an experiment carried out at Embrapa Gado de Corte, it was verified that this site is not adequate and feasible under Brazilian management conditions, as this device can be easily broken with routine handling procedure of throwing the rope on the base of the horn of cattle (Ferreira & Meirelles, 2001).

Thus, in order to use this technique more widely, some standardizations for our management conditions, involving the more excitable zebu cattle, must be observed.

2 Discussion

The intensification of health, reproductive and nutritional management of beef cattle, with the use of genetic improvement and herd management programs, requires the use of software. In addition, the need of a strict ownership control allowing the traceability required the international market increasingly implies in the need of the correct and immediate identification of cattle.

Lately, food safety became a global issue. In the specific case of beef, with the diagnosis of bovine spongiform encephalopathy (BSE1) in March, 1996, and the subsequent hypothesis of a link between this cattle disease and the Creützfeld-Jacob disease (CJD2) as a new variant of similar disorder in human beings, traceability became the focus of attention of both consumers and the meat industry worldwide (Wiemers, 2000).

Since then, in order to recover the confidence of the consumers, the participants of the cattle and beef supply chain are working to increase food safety standards.

The European Union, through Resolution CE N°820/97, requires the whole meat production process to be inserted in a identification and recording program that allow the retrieval of all information relating to an animal, from birth to final product consumption. This resolution affects European producers and industries, as well as their suppliers (Project IDEA, 2000). Because of this requirement, systems that allow reliable individual identification of animals and the possibility of real-time information retrieval are being developed (Project IDEA, 2000).

Traditional identifiers, such as tattoos in the internal face of the ear, hot iron branding, and numbered ear tags are most commonly used in cattle identification. However, breed and management diversity, besides the constant errors in the manual transcription of data, have stimulated the search for more efficient methods of animal identification, as the numbers in hot iron brands and ear tattoos are often invisible in animals with dark hides or with long hairs, making their revision too labor-intensive and inefficient.

As for ear tags, the incidence of annual losses varies between 3-15%, according to breed and environment, causing errors in the process of traceability, in addition to economic losses for the producer (Ferreira & Meirelles, 2001). Moreover, hot iron branding, often misplaced, damages the animal's leather, which has high economic value. The use of ear tags, when misplaced, may result in infections and grub infestation, in addition to being traumatic.

Leather is a very important product in the domestic economy, especially as raw material for the shoe industry. As an export raw material, it is more important than beef. In the last few years, there was in increase in revenues obtained with leather, which rose from 600 million in 1996 to 2.7 billion, according to the estimates for 2002 (Cardoso & Lima, 2002).

The electronic system, besides eliminating failures and difficulties, allows handling procedures, previously carried out in handling facilities, to be made on the fields, such as weighing. Therefore, an increase in herd productivity due to a higher frequency of data collection, which can be made daily, and also of decision-making, can be expected. Moreover, a differential analysis of experimental research results can also be made, as decision-making velocity can interfere in the results.

Since the beginning of the 1990s, Brazilian beef production, which was timidly trying to improve production efficiency, intensified its efforts as a result of pressures imposed by the globalization of the economy. The exposure of the markets of several countries to this globalized competitiveness observed in the last few years, made the need to have an efficient production a synonym of survival or permanence in the business (Embrapa Gado de Corte, 2002).

Thus, the search of improvement and excellence of a herd monitoring and management system depends on the comprehensive knowledge of the herd, and, certainly, of the correct identification of the animals.

3 Conclusions

The use, on the field, of an electronic system for precision animal production highlights the importance of this tool in beef cattle production;

- The results obtained value the process as necessary for the future that searches to improve production and assurance of meat traceability, a synonym of quality;
- The cost-benefit of the system will provide a foundation for financing and government agribusiness agencies.
- The results obtained in research are valuable for the technical-scientific community, and due to its innovative character, will stimulate research in this area in other regions of Brazil and other countries as well.

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