Electronic Identification of Pigs in Thailand

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Abstract

The aim of this study was to investigate the readability and retention rate of low and high, radio frequency identification system (LF and HF-RFID), ear tags of pigs in Thailand. In total of 150 terminal pigs (Landrace x Largewhite x Duroc) were divided into three groups, 50 pigs in each group. Group one and two were applied with LF-RFID ear tags with and without reading flap, respectively, and group three were applied with HF-RFID ear tags. The experiment was performed at a commercial pig farm in Rajaburi province, Thailand. The study started from December 2007 to March 2008. LF and HF-RFID ear tags consisted of plastic button tags containing passive microchips, in which recognized by the International Standardization Office (ISO) standard 11785 and 15693, respectively, and activated at 134.2 kHz and 13.56 MHz, respectively. Electronic ear tag was applied on the left ear by using the tagger tool. Each terminal pig was identified with ear notching and electronic ear tag. Reading of electronic ear tag was checked by using a standardized handheld reader, before and the day after applied on pigs. The reading was continued on every week until the last days of fattening. Chi-square analyses were performed to study differences in the readability and retention rate between LF and HF-RFID ear tags. No apparent animal health alterations were observed during the study. There were no significant differences on the readability and retention rate between LF and HF-RFID ear tags. Readability and retention rate at the end of the fattening period were 100% and 99.33%, respectively. There were some damages and losses of the reading flaps, LF-RFID. Electronic ear tags were easier and faster to read than the visual ear notching. The results indicate that LF and HF-RFID ear tags might be one alternative choice to use for pig traceability.

Keywords: Radio frequency identification, ear tag, pig

Introduction

Individual identification in pigs is a key success for management, traceability, and disease control. Several conventional identifications used by producers to identify their pigs are not adequate efficiency, i.e. ear notching, ear tags, and tattoos. An effective identification has to be individualized, permanent, simple to apply and read, welfare appropriate, and robust proof. To improve traceability throughout the lifetime of the pig, a permanent and unique code electronic identification system is the most applicable technology. Animals can be individually identified using a radiofrequency identification (RFID) tag in or on the animal and a reading device which can read the unique code stored in the tag (Caja et al., 2005). Since the code is unique, it can be used to identify the animal which carries the tag. Several studied has been investigated the use of the electronic identification in pig (Stärk et al., 1998; Caja et al., 2005; Babot et al., 2006; Santamarina et al., 2007). In most cases, the low frequency radiofrequency identification
(LF-RFID) was studied. Moreover, LF-RFID operation is standardized by ISO 11784/85 (Kampers et al., 1999). Recently some suppliers have announced the superiority of the high frequency radiofrequency identification (HF-RFID) for use in livestock applications, such as in pigs and cattle, and start testing in some countries i.e. Japan and China. However, HF-RFID has not been deployed together for animal/livestock identification. To my knowledge, no previous study has been performed comparing the LF- and HF-RFID ear tags of pigs in Thailand. Thus, the aim of this study was to investigate the readability and retention rate of low and high radio frequency identification (LF and HF-RFID), ear tags of pigs, from growing to the end of the fattening period (from 25-100 kilos), under farm conditions in Thailand.

Materials and Methods

This study was conducted on a commercial pig farm in Rajaburi province, central part of Thailand. The study started from December 2007 to March 2008. In total of 150 terminal pigs (Landrace x Largewhite x Duroc) were divided into three groups, 50 pigs in each group. Two types of electronic ear tags were used, low and high radio frequency, LF- and HF-RFID. Group one and two were applied with LF-RFID ear tags with and without reading flap, respectively. Group three was applied with HF-RFID ear tags. LF-RFID and HF-RFID ear tags consisted of plastic button tags containing passive microchips, in which recognized by the International Standardization Office (ISO) standard 11784 and 11785, and activated at 134.2 kHz respectively, and recognized by the ISO 15693, and activated at 13.56 MHz., respectively. Pigs were kept in an evaporative cooling housing, 25 pigs in each pen with solid floor. All electronic ear tags were applied on the left ear by the farmer using a commercial tagger tool (Fig. 1). Reading of electronic ear tag was checked by using a standardized handheld reader, before and the day after applied on pigs. The reading was continued on every week until the last days of fattening. Ear tag was removed from pig before sending to the slaughter house. All tags were visually recognizable in order to make it possible to trace them back to individual pig when lost and found. When tags were lost or removed, the date and the reason for removal or failure was recorded. Chi-square analyses were performed to study differences on the readability and retention rate between LF- and HF-RFID ear tags.

Fig. 1 Installation of different type of ear tags, LF (white color) and HF (yellow color).

Results and Discussion

The average total fattening period was 110 days. During this time period, there was no pig culled or dead. No apparent animal health alterations were observed on the day and after the day of application of electronic ear tags, or during the reading period of the study. This finding
agrees with Caja et al. (2005) who found no negative effects of using injectable tags or ear tags in fattening pig. The reading of all tags took approximately 40 min. One ear tag, LF-RFID ear tag without flap, lost was observed. There was one LF-RFID without flap was broken (red arrow in Fig. 2). 14-pigs were lost some partly plastic flap or totally flap (blue arrow in Fig. 2). The lost or damaged of plastic flap were observed in a few days after applied in pigs (personal communication). These damages might caused by chewing of pigs.

Fig. 2 Ear tags after used in pigs.

There was no significant difference in the readability rate between LF- and HF-RFID ear tags. Readability at the end of the fattening period was 100%. The broken ear tag was readable. The reading distance was according to the manufacturers' specification. However, the reading distance of HF-RFID reader was too to be practical longer and faster than LF-RFID reader (LF-RFID 7-10 cm; and HF-RFID 10-15 cm). This might be explained by the differences in the design of antenna of the reader. However, the reading efficiency was not recorded in this study. All electronic ear tags were read promptly and accurately at all times. However, some ear tags, both LF and HF tags, could not be read on several occasions during the studying period because the numbers were covered with dried feces. The retention rate was no differed among LF- and HF-RFID ear tags (LF-1 = 100%; LF-2 = 98%; HF = 100%, Table 1.). This observation is in agreement with results from some earlier studies showing high values of retention rate in fattening pigs (Caja et al., 2005; Babot et al., 2006).

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<tr>
<th>Table 1. Readability and retention rate in pigsa</th>
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<tr>
<td><strong>No. of pigs</strong></td>
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<tr>
<td>Lost tags, No. (%)</td>
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<td>Lost flap or partial damage, No. (%)</td>
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<tr>
<td>Broken tags, No. (%)</td>
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<tr>
<td>Retention, No. (%)</td>
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<td>Readability, No. (%)</td>
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a Abbreviations: Low frequency ear tag with flap (LF-1); Low frequency ear tag without flap (LF-2); High frequency ear tag (HF).

In conclusion, there was no overall difference in readability and retention rate between LF-RFID and HF-RFID. The use of either low or high radio frequency identification (RFID)
could be an alternative tool for pigs. However, to further maximize the benefit of HF-RFID of pigs under field conditions, further investigations on the using HF-RFID in long term and in a large scale of pigs are needed.

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References