活用國際畜政聯盟(ICAR) 驗證的畜禽無線射頻裝置

黃鈺嘉

聯通整合系統股份有限公司

資料來源

ICAR Homepage > ICAR Meetings and news > Previous meetings >
Riga Biennial Session
31 May - 4 June 2010

國際畜政聯盟(ICAR)之會員國
2013 年會暨科技會議(丹麥)
行政院農業委員會畜產試驗所
黃英豪所長、吳明哲組長、張菊犁分所長

出國報告
出國類別：開會(出席會員國會議)

國際畜政聯盟(ICAR)之會員國
2013 年會暨科技會議

服務機關：行政院農業委員會畜產試驗所
姓名職稱：黃英豪所長
吳明哲研究員兼遺傳育種組組長
張菊犁研究員兼新竹分所分所長
派赴國家：丹麥
出國期間：民國 102 年 5 月 26 日至 102 年 6 月 1 日
報告日期：民國 102 年 8 月 1 日

1

Reading performance of animal radio frequency transponders

Pieter Hogewerf, Henk van Roest & Kees van 't Klooster
Innovative Modern Agriculture - Wageningen
IMA-Wageningen

Wageningen
The Netherlands

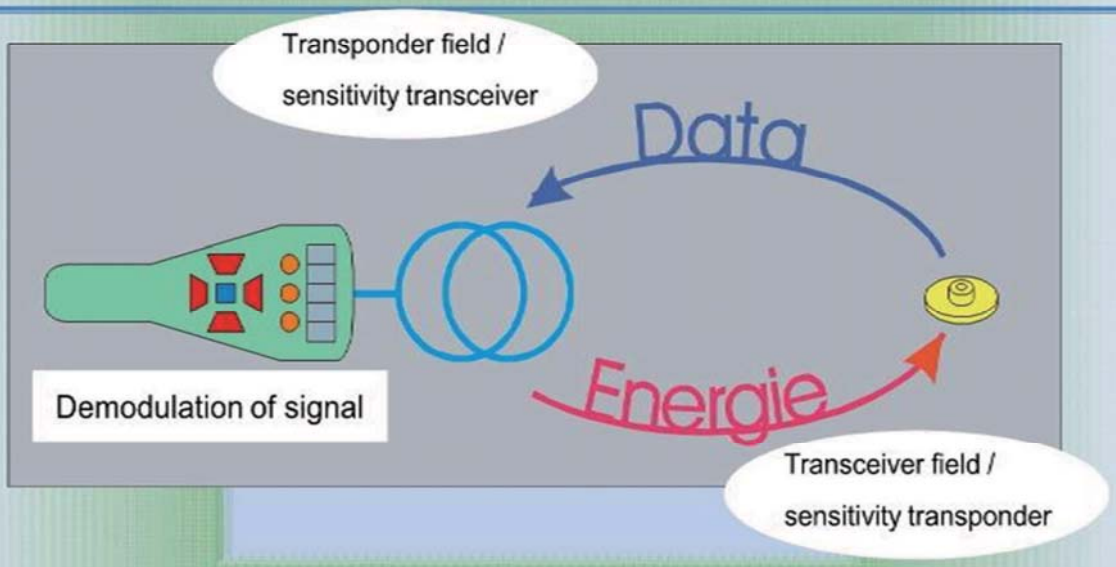
電子耳標讀取性能測試

http://www.icar.org/Documents/Riga_2010/

IMA-Wageningen

電子耳標讀取原理

Principle of RFID (reading process)



Readability influenced by transceiver & transponder

➔ Independent testing

IMA-Wageningen

http://www.icar.org/Documents/Riga_2010/

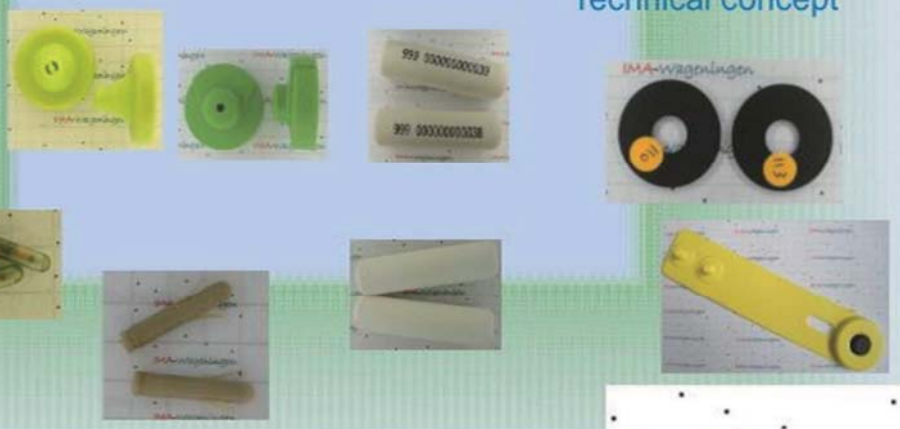
ISO, 全雙工與半雙工

Animal Identification standards: ISO 11784 & ISO 11785

ISO 11784: Radiofrequency identification of animals – Code structure

ISO 11785: Radiofrequency identification of animals – Technical concept

- HDX
- FDX-B



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IMA-Wageningen

http://www.icar.org/Documents/Riga_2010/

測試程序

Animal Identification standards: Test procedures

Test procedures:

- Developed by
  - ISO TC23\SC19\WG3
  - ICAR
- Procedures for:
  - Transponders
  - Transceivers
- Guaranteeing worldwide readability
- Making a founded selection of the available products
- Registration authority: ICAR (www.icar.org)

ISO International Organization for Standardization

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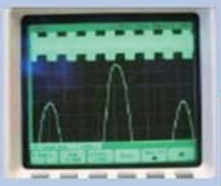
結構測試

ISO 11784 & ISO 11785 conformance testing

ISO 24631-1: Radiofrequency identification of animals -- Part 1:

Evaluation of conformance of RFID transponders with ISO 11784 and ISO 11785 (including granting and use of a manufacturer code)

- Readability check:
  - Read by reference reader
  - Telegram structure
  - Identification code
  - CRC calculation (cycle redundancy check)



- Quality check
  - Resonance frequencies
  - Modulation side bands
- Responsibility has been taken for guaranteeing uniqueness ID
  - Country codes [001 .. 899 (ISO 3166) + 12 digit id code] ← Uniqueness of codes national responsibility!!!!
  - Manufacturer code [901 .. 998 + 12 digit id code]
  - Shared manufacturer code [900 + specific 12 digit id code]

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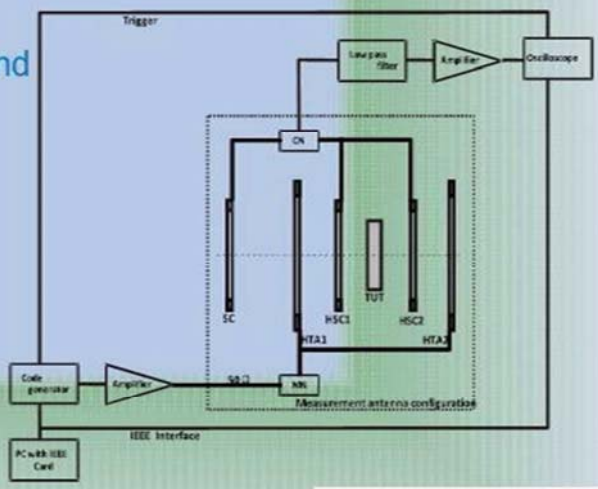
ISO 24631-3 測試設定

ISO 24631-3 test configuration

"Helmholtz Coils":

- Configuration can easily be configured
- Generates reproducible field
- Independent from a reader brand
- Balanced for FDX-B & HDX



全雙工與半雙工場域平衡

Pieter Hogewerf, 37th ICAR Session and InterBull, 3rd of June 2010, Riga, Latvia

IMA-Wageningen

http://www.icar.org/Documents/Riga_2010/

已經性能測試過的RFID耳標

http://www.icar.org/Documents/Riga_2010/

強制性電子識別 2010/5/31

http://www.icar.org/Documents/Riga_2010/

CHOSEN IMPLEMENTATION METHOD

Mandatory EID tagging after 31. May 2010
- All herds
- All calves born
- All animals imported

Why this method
- No extra work
- Costs start at expected future level
- Benefits harvested by service providers higher than total annual costs
  - Also farmers not using EID technology themselves will benefit
  - So they should also contribute

Electronic tag in animals left ear - Normal plastic tag in right ear

March – May 2010 all new numbers delivered with EID

May 2010 possibility to order EID tag to replace issued non EID tags
- Avoid "holes" in animal number sequence

20 INTRODUCTION OF MANDATORY ELECTRONIC IDENTIFICATION

RYK

INSTITUT DE L'ELEVAGE

法國牛隻 RFID 辨識追蹤系統

The French bovine identification and traceability system, updated with the technology of RFID

Louise MARGUIN

http://www.icar.org/Documents/Riga_2010/

Individual identification and traceability

流通唯一碼: 國別 + 場別 +動物

- **A national traceability system needs:**
  - A national identification system : each animal, farm and premises have an exclusive code
  - The record of **each movement** (entrance / exit) for every animal, and then meat pieces, **in their successive premises**
  - The record, the control and the centralizing of the whole animal information
    - In a national database
    - Thanks to an information system

http://www.icar.org/Documents/Riga_2010/

French eartag

法國的12位編碼

- **Identification code = country code + national number**

= FR + 10 digits

= FR 75 8212 3456

Country code

Barre code

http://www.icar.org/Documents/Riga_2010/

RFID耳標 在法國的應用

Key data

http://www.icar.org/Documents/Riga_2010/

- Premises:
  - farmers : 275 000
  - traders and cooperative : 1 500
  - markets : 100
  - slaughterhouses : 250
  - rendering plants : 70
- Number of notifications per year:
  - birth : 8 millions per year
  - movements (entrance and exit): 25 millions per year
  - slaughter : 6 millions per year
  - rendering plants : 1 million of animals
- BDNI:
  - more than 80 millions animals recorded
  - more than 250 millions movements recorded

RFID on farm : Minimal equipment to benefit from RFID interests

基本配備

Chip on the animal

Eartag

Reading distance

Reader

BlueTooth connexion

Connexion (for cable and Blue Tooth)
Electric energy
Memory
Screen
Buttons

Computer functionalities

PDA or PC or intelligent reader

Software

http://www.icar.org/Documents/Riga_2010/

RFID on farm : Transponders types and limits

- **Transponder's type depends on the operation to do :**
  - During milking or for AI insemination, behind the animal ➔ pastern tag on a behind leg
  - During feeding in head blocks on the head ➔ eartag
- **Experiences in French pilot projects show that individual RFID reading is not easy during manual individual operations like births, sanitary treatments, AI**

日常管理操作不夠順暢

http://www.icar.org/Documents/Riga_2010/

RFID allows automatisation of weight recording

RFID in electronic scale for cattle

A scale coupled with an ISO reader to weight the cattle entering in the pen.

The door opens when the tag is read and the weight is obtained.

If the tag is not read, the identification number is recorded manually or with a handheld reader.

固定式與手持式讀取器並用

http://www.icar.org/Documents/Riga_2010/

聯通整合系統 股份有限公司

- 成立時間：2008年
- 公司登記地：台灣 台中市

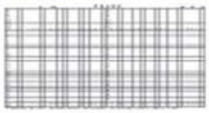
- 主要營業項目：
  1) 銷售代理及自有品牌之產品 – 10%
  2) 提供系統整合方案 – 55%
  3) 提供軟體服務 – 35%

應用雙頻讀取器協助收集雞隻產蛋記錄

林德育 黃鈺嘉 李世昌 賴永裕 吳建興 吳明哲
行政院農業委員會畜產試驗所

前言

產蛋紀錄的收集與資料的輸入對雞隻產蛋數的育種是一項花費人力且易有資料輸入錯誤發生的工作。通常由現場以產蛋紀錄表格記錄每隻母雞每天的產蛋資料，再依產蛋紀錄表輸入產蛋紀錄於電腦中，再進行後續的統計分析。為節省雞隻產蛋資料紀錄與資料輸入的人工花費，降低錯誤資料輸入的機率，本試驗擬應用雙頻讀取器與電子標籤來研發協助收集雞隻產蛋記錄方法。



產蛋紀錄表

現場記錄產蛋紀錄

輸入產蛋紀錄於電腦中

圖 1. 一般產蛋紀錄的收集與資料輸入。

材料與方法

1. 使用125 kHz電子標籤於個別母雞籠來標示母雞個體所在的位置(棟、層、段及籠號)，再以 134.2kHz電子標籤來標示集蛋的類別，包括產雨個蛋、破蛋、軟蛋及有賴抱 行為等，正常產一個蛋只記錄籠號，其他情況則加記集蛋的類別電子標籤。
2. 利用無線射頻辨識雙頻讀取器(RFID Reader)來記錄個別母雞的產蛋紀錄。
3. 可由電腦執行藍芽網路自動讀取程式產出集蛋資料，直接形成.xls或.txt等檔案。
4. 更可及時將最新產蛋紀錄完成建置，利於及時統計分析，作為選種依據。

圖 2. 亞洲地區通用的 134.2kHz全雙工動物電子標籤與125kHz 電子標籤。

圖 3. 利用無線射頻辨識雙頻讀取器讀取電子標籤來記錄產蛋資料。

結果與討論

本試驗使用之讀取器設備內建記憶體至多可以儲存6000千筆資料，搭配雞籠電子標籤及集蛋類別標籤等紀錄，至多可以記錄3000隻雞隻產蛋紀錄，已足夠應用於記錄雞隻產蛋紀錄的需求。

而使用讀取器設備內建藍芽設備可方便與個人電腦之藍芽設備直接配對使用，並且可以快速地作資料傳輸及儲存為Excel格式檔案如圖4。而產生的雞隻產蛋紀錄Excel格式檔案，可以直接使用批次資料處理方式匯入至資料庫，減少大量人工輸入作業。

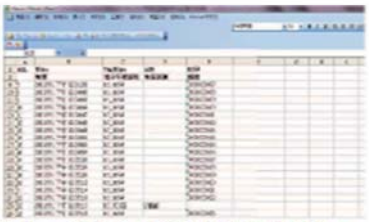


圖 4. 一般產蛋紀錄的收集與資料輸入。

結論

本試驗利用現有亞洲地區通用的 134.2kHz全雙工動物電子標籤與125kHz 電子標籤，結合RFID多頻讀取器依序記錄母雞產蛋日期、動物位置(ANIMAL POSITION)及產蛋狀態，即操作動作(OPERATION ACTION)，再搭配市售雙頻讀取器隨機轉檔軟體，將資料檔以藍芽傳輸至筆電後，利用 EXCEL 的排序 與LOOKUP 功能，免除資料輸入的人工成本與時間，避免人工輸入所產生之錯誤資料的發生，達成簡易且有效率地收集與建置產蛋數檢定的資料。未來更可結合134.2kHz半雙工標籤，RFID多頻讀取器及搭配市售三頻讀取器隨機轉檔軟體等技術，利用多頻讀取機特點，結合動物管理重要原素：時間、動物、人及操作動作 與動物位置，將可應用於畜禽試驗資料收集與建置、動物用藥記錄及畜禽生產之飼養管理。

USING DUAL FREQUENCY RFID READER TO RECORDING LAYING EGGS OF HEN

D. Y. Lin, Y. C. Huang, S. C. Lee, Y. Y. Lai, C. H. Wu and M. C. Wu
Livestock Research Institute, Council of Agriculture

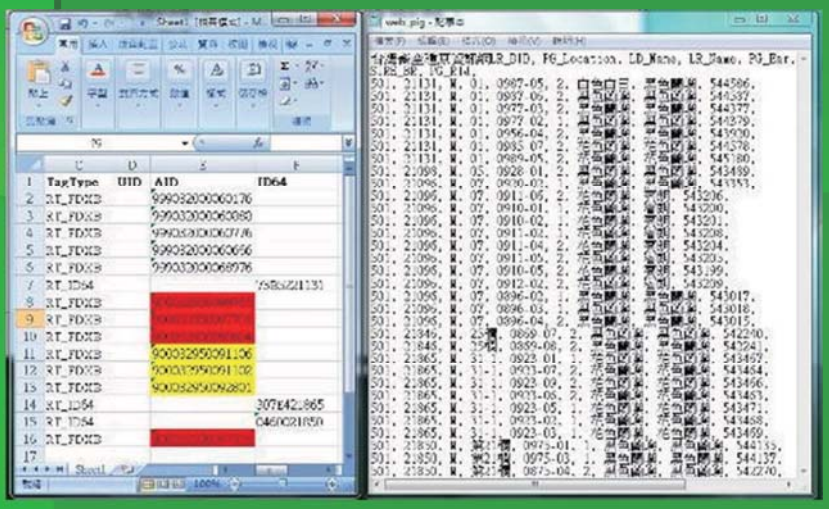
To achieve less data entry costs and fewer data entry error, a two frequency RFID readers is used to read 125kHz and 134.2kHz RFID electronic tags for cage identification (ANIMAL POSITION) and type of eggs (OPERATION ACTION) with recorded date-time. The commercial reader with data transfer software, egg collected data can be transferred to computer or data storage device by bluetooth or USB connection. After EXCEL sorting and LOOKUP functions, the recording system of RFID readers can eliminate manual data entry costs and time and avoid errors arising from manual input, which can simplify the procedure of egg collection. In the future, breeders can use multi-band RFID reader and associated software to achieve data collection of the ids of the manager, animal position and recording date-time and operation action, such as animal medication, feed and feeding and other management information for animal breeding.

台東種畜繁殖場

生醫用小型豬生產履歷

聯通整合股份有限公司

豬場日常盤點作業



RFID reader

生產履歷 | 品種訊息

生醫用小型豬生產履歷

供應單位：行政院農業委員會 畜產試驗所 台東種畜繁殖場

品　　種：　畜試花斑豬

性　　別：　♀

耳　　號：　0083-08

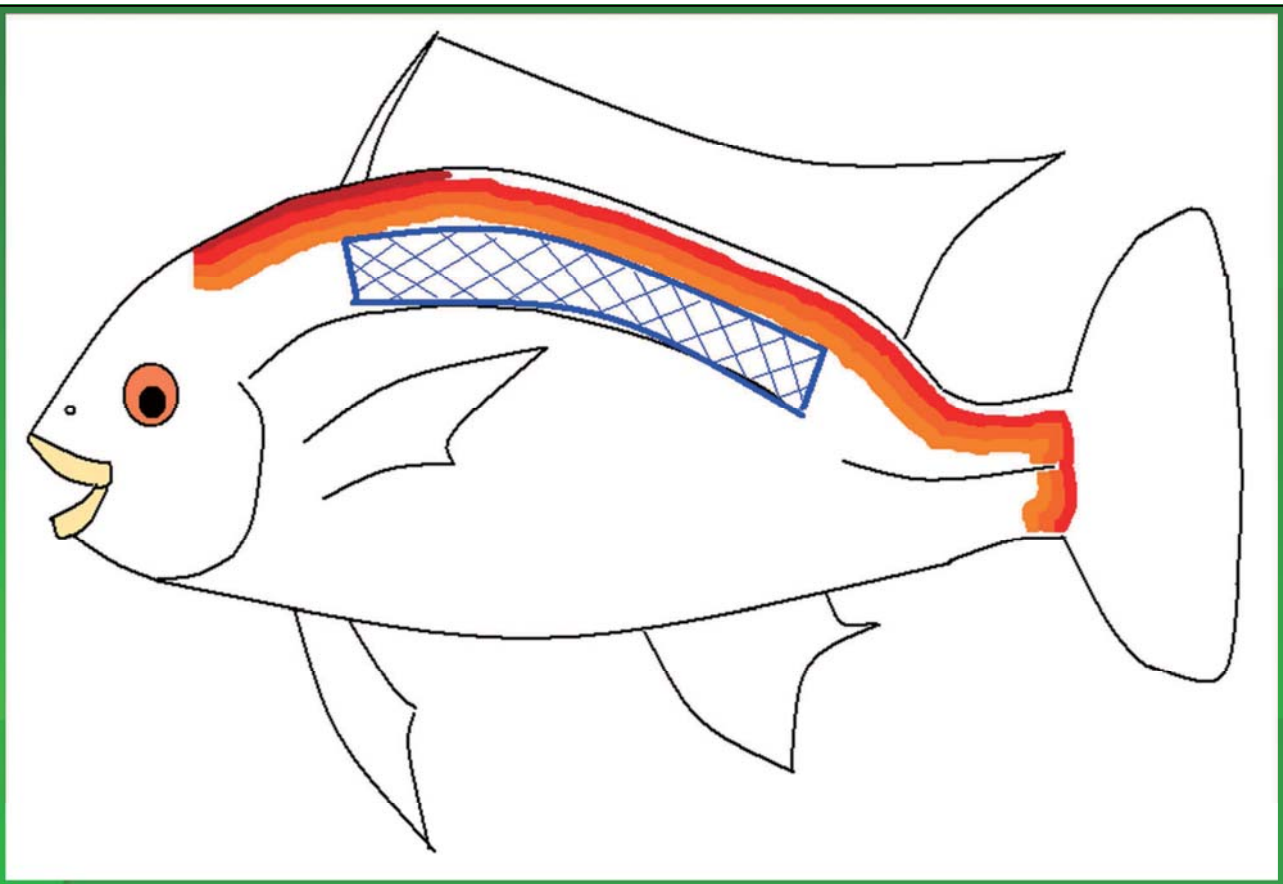
ENGLISH

出生日期：	2010. 8. 7	出生體重：	0. 65	Kg
離乳日期：	2010. 9. 16	離乳體重：	7. 6	Kg
推廣日期：	2010. 11. 5	推廣體重：	22. 5	Kg

防疫注射記錄：

疫苗種類	IRON	AR	HC	LEP	FMD	PR	EXC	OTC	SEP
注射日期		2010.8.9	2010.9.16 2010.10.7		2010.10.29	2010.10.7		2010.10.29	2010.9.16

AR : Atrophic Rhinitis　**HC** : Hog Cholera　**FMD** : Foot-and-Mouth Disease
PR : Pseudorabies　**OTC** : Shotapen　**SEP** : Mycoplasma hyoplasma bacterin
EXC : Excede　**LEP** : Lepicom　**IRON** : Iron dextran



水試所 **RFID** 應用於吳郭魚 育種研究

感謝您的耐心參與

http://www.itmc.com.tw

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