PIG BREEDING DATA MANAGEMENT IN ESTONIA

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Introduction

This paper gives overview of animal recording system in Estonia. There are about 352000 pigs in Estonia and about 47% of sows and boars are under the animal recording. Pig breeding steering takes place in the one breeding organisation in Estonia - Estonian Pig Breeding Association. They coordinate spreading breeding material (breeding animals, AI), measure the field test data and run sibling test. In Estonia a national breeding program "marble meat" is used with aim to produce high quality meat by crossing breeds PiHa x LY, Pi x LY or Ha x LY. The nucleus population of the Landrace (L) comprises 280 sows and Yorkshire (Y) 260 sows are dispersed in 5 herds. There are 37 multiplier-herds with 6500 crossbred sows.

The Structure of Pig Breeding

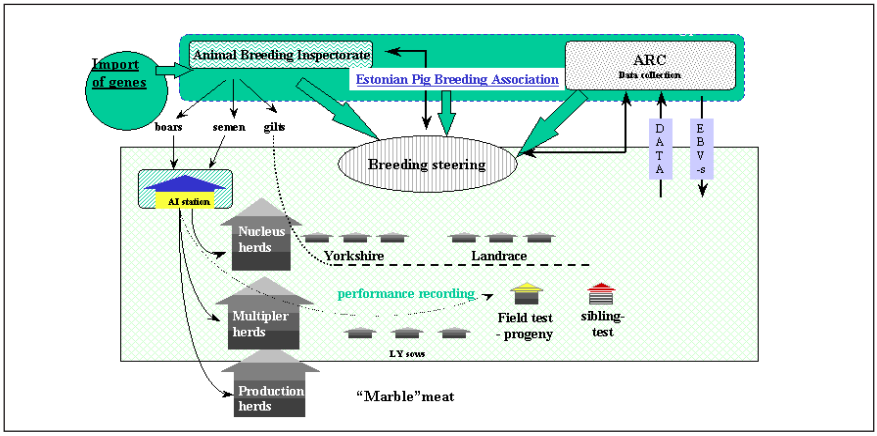

Figure 1. The structure of Estonian pig breeding

All breeding data are collected to Estonian Animal Recording Centre (ARC). The mission of ARC is to provide reliable data and quality service to animal owners for breeding. ARC activities are: collecting performance data of dairy cattle, beef animals, pigs and goats, milk analysing in independent laboratory of ARC, genetic evaluation of dairy cattle and pigs.

The aims of animal recording are:

1. To make the production of animal breeding products more effective;

2. To give the producers the possibility to compare the production level against the competitors on the basis of producers average performance. This gives also a possibility to deal with weaknesses on every farm and to build up a good advisory service to help farmers to produce more effectively.

3. To estimate breeding values for the breeding stock.

To have accurate breeding values breeders have to provide reliable performance data.

In general the data stream is the same as in many breeding systems. There is management program on farm level, where farmer inserts all data needed for breeding and management. Field data are uploaded directly to ARC server via the Internet or sent by email or floppy.

The data are transferred to ARC database through the quality control system to filter out the illogical data. When checked data are stored in database, the breeding value estimation can take place.

Data

The data recording system in Estonian pig breeding is a combination of two systems: PC-based herd–management system and the central relational database (Oracle) in Estonian Animal Recording Centre, where data from all the

pig breeding and production farms are virtually connected.

Animal recording centre collects pedigree data: all animals have to be registered with ear tag, birth date and birthplace. All breeding animals sold should have a pedigree certificate or other sales documents with accurate pedigree data. Possu enables electronic transfer of pedigree data for sold animals – reducing mistakes in pedigree.

Fertility data: data about inseminations, farrowings, weanings (dates, boars, weights, comments, aborts etc.)

Field test data: backfat thickness and muscle depth are measured with ultrasonic PIGLOG 105 at an age of ca 180 days (weight ca 100 kg) on field-test. Test weight, backfat, daily gain and muscle measures are adjusted to a weight of 100 kg, exterior (number of teats, legs, corpulence).

Boar test data: All AI boars are monitored through a boar test, where boars' progeny and brothers and sisters are estimated through the slaughter data using Scan Star equipment. In abattoirs FOM 300 equipment is used to measure backfat, loin eye thickness and additionally also carcass is weighted. Then the carcasses are cut into two along the backbone and 4 backfat, 2 carcass height measures are taken. Then the one side of half carcass are cut cross between 13. – 14. rib. A digital picture is made of the cut area and Scan Star software measures loin eye area and fat area and also fat side thickness.

The slaughter and growth traits data are not collected.

New sow management software – POSSU is used for collecting pig performance data on farm level. Possu was introduced last year and by now all the pig recording clients use this software. ARC programs Possu and whenever there are changes in breeding program (new traits, new indexes etc.) or other new requirements appear, the changes can be made quickly and with small expenses.

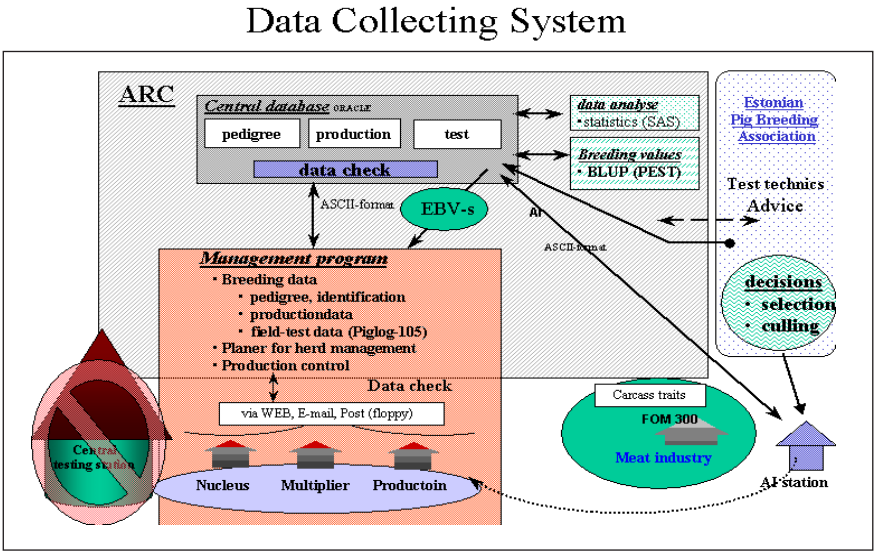

Figure 2. Data collecting system.

For farmers working with Possu it is possible to get up-to-date information very easily. The software reduces paperwork in farm and enables to print useful reports for accounting sector in firm.

Software makes the first checks of inserted data and it also has fast access to the ARC web server to send the data though the Internet directly to the ARC database.

ARC provides Possu with miscellaneous information about available AI boars: fertility, their daughters' fertility, the breeding values, and information about progeny test data. There is also developed a "pair selection" system for sows. It helps finding suitable boars for certain sow avoiding inbreeding and taking into account the breeding values of sow and boar. Also many tools are created for pig breeding association, for example to print pedigree certificates directly from ARC database and to assess breeding generally.

Prediction of breeding values

Data collection started in 1998. Currently Landrace, Yorkshire, crossbred animals are taken into consideration for prediction of

breeding values. Breeding value estimation for Pietrain started in 2005 and is estimated separately from "white" breeds. Breeding values are predicted using the programme package PEST. Breeding values are calculated using BLUP multiple-trait model. The average daily gain, backfat and muscle depth are included into the model of production traits. Sex, technician and breed are included as fixed effects, common litter and animal as random effects. Additive relationship is accounted for. Litter effects are assumed as unrelated. Mathematical models for backfat and muscle depth include test weight as covariant. Average daily gain is pre-adjusted for test weight by using animal regression. Definition of the herd-year-season class depends on the number of tested animals. Genetic parameters for production traits where estimated in 2005.

The estimated breeding values for each trait are loaded into the database to be available for further use e.g. to calculate aggregate genotype, and for selection decision, regular monitoring of genetic trends or control of inbreeding levels.

Expression of genetic values are relative breeding values (RBV) for production index P_RBV with mean of 100 and std. dev of 6 points, combining breeding values of backfat, muscle depth and daily gain. Relative economic weights for different traits are: 30% for backfat, 40% for muscle depth and 30% for daily gain. Genetic base animals for production traits are born in 2001. Breeding values are estimated and published weekly.

Breeding values for fertility traits are estimated separately from production estimation. Genetic base animals for fertility traits are without pedigree. Breeding values are estimated and published weekly.

Conclusion

The reports of animal recording, breeding values, breeding development, usage of AI boars and often useful information are provided via Internet. Every breeder can sign in and make on-line queries respectively to his/her needs.

ARC aims to provide better, customer-friendly and trustworthy

service for breeders' purposes. Due to the effective breeding systems the genetic trend of breeding stock is guaranteed and it is easy to find the best breeding material. Also great deal information is built up to make a good advisory service for breeders. Using the AI boars is more and more popular among breeders.

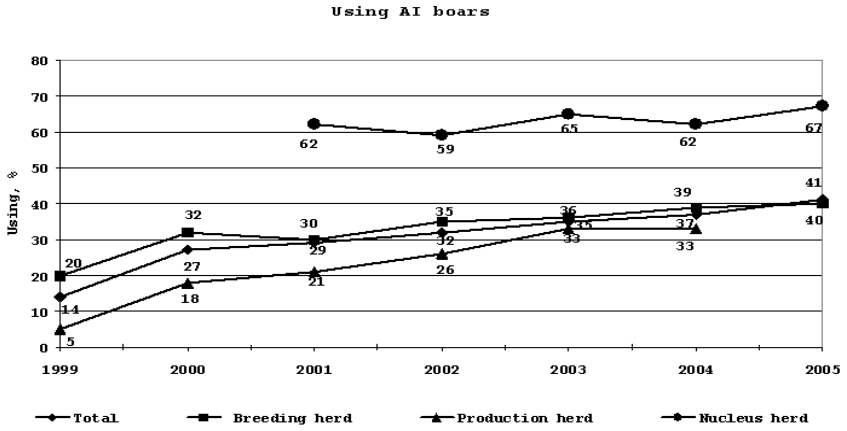

Figure 3. Using AI boars in different farm types.

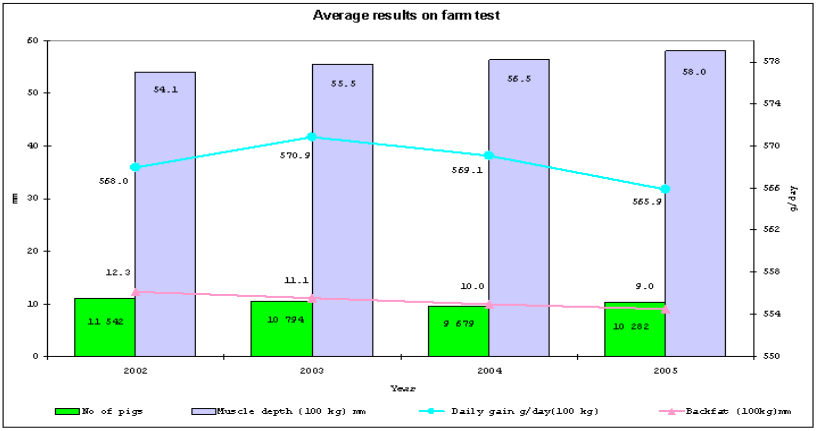

Figure 4. Average test results.

Using AI is the best way to spread good breeding material. AI is a safe, cost effective method of making genetic gain when semen from accurately tested, high ranking boars is used.

If there is a system to gather good quality data, system to analyse and publish it and a breeders interest, there can be made a good breeding work.