STANDARDISATION OF PIG CARCASS CLASSIFICATION IN THE EU THROUGH IMPROVED STATISTICAL PROCEDURE AND NEW TECHNOLOGICAL DEVELOPMENTS

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Background

The pig population in Europe varies from light and lean pigs to heavy and rather fat pigs depending on the quality demands. About 15 years ago, the EU countries agreed on a common reference of the carcass quality defined by the lean meat content determined by dissection. The percentage of lean meat is used as basis for payments to the producers as well as a measure of quality in pig meat trading.

The lean meat content in all European pig carcasses has to be assessed using a measuring method with a given precision. The requirements in the EC Regulations only stipulate the precision of the calibration. The project will include an assessment of the accuracy of the reference method and the different types of classification equipment, respectively.

Each type of classification equipment is calibrated by means of a test sample of pig carcasses representing the population. Both the instrumental information and the reference (the lean meat content by dissection) are collected and used to estimate the relationship between the instrument and the reference. In principle this is the way to calibrate each type of classification equipment. However, the pig population differ from country to country, and the different types of classification equipment are technologically different. Therefore, the procedures for sampling and calibration are not comparable. Statistical questions associated to these problems will be considered.

The determination of lean meat content by dissection is very expensive and, consequently, alternative methods have been developed to reduce expense without reducing precision. However, these methods are used to calibrate relatively simple classification equipment only. Without further research it is not possible to use the methods with new technologically advanced classification equipment. Furthermore, it is a general wish to find an alternative reference, which is cheaper and preferably as precise as the primary reference.

Until now, the efforts to harmonise issues concerning pig classification have been limited to a common reference and calibration requirements. After implementation in the industry, the monitoring of the pig classification has been carried out on a national level. Common principles of a monitoring system will be developed.

Objective

The objective is to develop improved statistical procedures and to assess new technology for the calibration, testing and monitoring of pig carcass classification, in order to achieve a high level of standardisation throughout the EU. The objective consists of three parts:

① A standardised documentation of the reference method and the prediction ability of the present classification instruments (robustness and the accuracy) and, consequently, a code of practice for monitoring the classification.

② A study of the main statistical problems encountered in the application of the EC Regulations in the scope of pig classification. That means sampling difficulties and estimation and validation problems for different statistical methods resulting in a statistical handbook to be used in context with the EC Regulations.

③ To develop indirect methods of predicting the lean meat percentage of a pig carcass highly correlated with the reference dissection method.

Methods

The project started 1 February 2000 and is characterised by a broad participation combining the knowledge represented by theoretical and practical statisticians, meat scientists and engineers in the meat and instrument industries and universities within the EU and the countries applying for membership of the EU:

University of Gent, Department of Animal Production (B), Danish Institute of Agricultural Sciences (DK),
SFK Technology A/S (DK), Bundesanstalt für Fleischforschung (D), Institut de Recerca i Technologia Agroalimentàries (E)
Institut Technique du Porc (F), Université de Bretagne Sud (F), Centre national du machinisme agricole, du génie rural des eaux et des forêts (F), Teagasc, The National Food Centre (IRL), Institute for Animal Science and Health (The stichting DLO) (NL),
Swedish University of Agricultural Sciences (S), Swedish Meats R&D (S), Kaposvár University, Faculty of Animal Science (HU)

The project is organised in three parts according to the three parts of the objective. In the first part, ① a team of 8 butchers – one from each of the 8 EU countries represented in the project – will, in pairs, dissect a sample of pig carcasses. To some extend the pig carcasses will represent the range of fat and lean pig carcasses in the EU, as the samples originate from Sweden, Spain, Belgium and The Netherlands. Both sides of the carcass will be dissected. When all data have been collected it will be possible to estimate the reproducibility of the reference dissection method. Furthermore, the experiment is designed so that the influence from "noise factors" like the fat-levels and the butchers can be evaluated.

Reproducibility of all on-line methods utilised in the EU will also be tested. Finally, the results will be used to recommend a system to monitor the daily use of on-line methods, the purpose of which is to make it possible to discover errors or deviations from an accepted reference.

Technologically, on-line equipment varies from simple rulers to complicated full automatic equipment based on ultrasound. The statistical methods relating on-line measurement and reference values differ a lot in the two extremes and it is problematic to compare the results. In the second part ②, a team of statisticians will study various aspects like sampling, estimating prediction formulas and evaluation. The statistical team also support the project designing experiments for part ① and ③.

Finally, in ③ an alternative reference will be considered. Three methods will be evaluated based on: vision techniques, X-ray CT and NMRI (Nuclear Magnetic Resonance Imaging). A sample of half carcasses will be scanned by both an X-ray CT scanner and a NMRI scanner. Afterward, the carcass will be cut in specified pieces and the surface will be photographed.

Results and discussions

The three parts run parallel. Even though parts of the project are mainly allocated to some partners, the project will be carried out in collaboration between all partners. The figure below shows the main relations between the project and the 14 partners.

At this stage of the project, experiments are running and the purpose is to collect data for both part ① and ③. The main result at this stage is a common understanding of the problems concerning sampling and uncertainty in measurements. The results will be communicated by means of workshops and newsletters. Further information can be found at WWW.EUPIGCLASS.ORG.
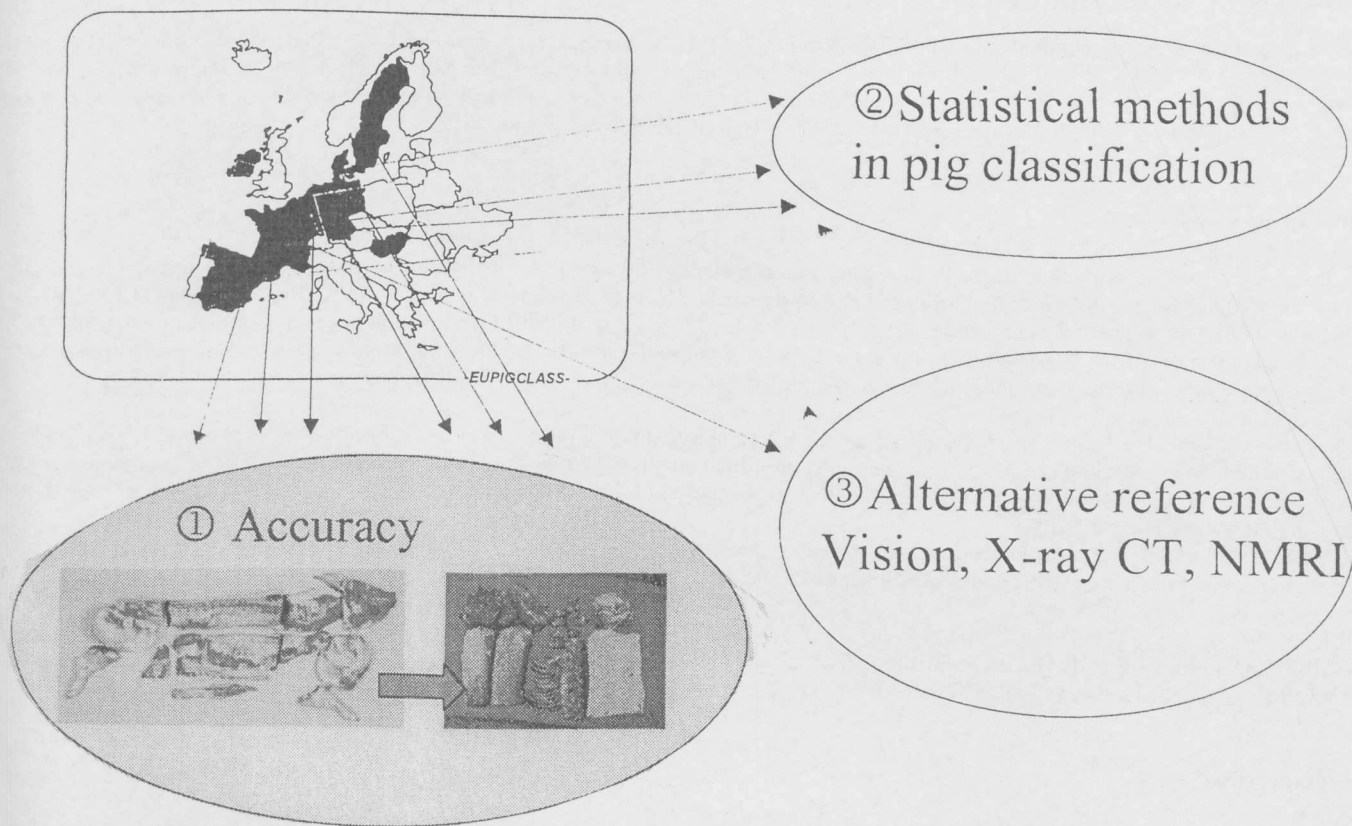

Figure 1. The EUPIGCLASS project. A sketch of the relations between partners and project parts.