



Dear LEARN Readers,
As an interesting LEARN workshop was held on October 1st at the SLU, I have asked our Deputy Dean Torkel Ekman to provide a summary of the workshop.

CHRISTINE JAKOBSSON
SENIOR PROJECT MANAGER

LEARN Autumn Workshop

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LEARNs autumn meeting gathered a good crowd to discuss the new Swedish Strategy for Food Production and to learn about the project Paths to a Sustainable Food Sector. The latter has been run in cooperation between SLU, SIK and JTI under the leadership of Ulf Sonesson SP. The workshop was split into two parallel sessions with dairy and meat in one half and pork and poultry in the other. We had the pleasure of hearing Lars Olsson from the Ministry of Enterprise and Innovation, describe the plans for the new Strategy for Food Production. Lars informed that the aim of the strategy is to increase production, economic output and number of jobs in primary production and other parts of the food industry and also to support export efforts. The VH-faculty and SLU are particularly pleased that the ministry intends to increase support and funding of R&D. The Government intends to present a proposal in May or June 2016. You can follow the work at www.naringsbloggen.se/livsmedel. Two farmers – Anders Birgersson, dairy and Ola Göransson, poultry and chairman of the Swedish Poultry Meat Association, informed the participants of the graveness of the current situation.

The other main number of the day was the presentation of Paths to a Sustainable

Food Sector, where several VH-researchers, Anna Hessle, Karl-Ivar Kumm, Helena Wall and Jan Bertilsson also participated. In the project, the researchers have done complete life cycle analysis of the effects on climate, environment and economy from selected products, such as sliced ham, milk and chicken. The results showed that there is a great potential for improvements in effects on the environment for all studied products without detrimental effects on cost of primary production. This is mainly due to increased efficiency at all steps of the production chain – in feed production and rearing of animals but also in processing and distribution. A prerequisite however is to maintain good animal welfare, to keep animals healthy and with a low need of antibiotics. There were also conflicts between different environmental goals, for instance: reduced use of chemical herbicides lead to lesser improvements in the goals for acidification and eutrophication. Find the report on the web: SIK-report 891.

TORKEL EKMAN
DEPUTY DEAN



Condemnation rates in chicken slaughter – is there a potential for improvements?

P Swedish meat-type chicken (broiler) production is successful as regards to maintaining a high production standard with a low use of antibiotics and an overall good health status compared to other countries. However, despite this, concerns are raised among people in the broiler sector regarding that the condemnations in Sweden seem to be at higher level than in our neighbouring countries. Striving towards low rates of condemnations is of importance as every condemned chicken generates a cost. Furthermore, with a reliable meat inspection process, condemnation data can become an important tool in identifying factors in the rearing phase that are associated with a particular cause of condemnation or high overall rates. Therefore, shedding light on the meat inspection procedure in Swedish meat-type chicken slaughter is of importance from an economic as well as animal welfare point of view.

In a new project we will focus on different aspects of condemnations at slaughter of chickens in Sweden and in neighbouring countries. A thorough investigation of the procedures at inspection will be conducted in Sweden, Denmark and Finland

to shed light upon differences and search for possible potential for improvements. Thereafter the reliability in the meat inspection process will be assessed. Ensuring that the meat inspection has a high sensitivity, i.e., that abnormalities are detected is of course of importance from hygienic and food safety point of view. However, when using condemnation frequencies in a systematic search for correlations with factors during hatch and rearing, it is of equal importance that healthy carcasses are not rejected on false premises. Therefore, a high reliability is of utmost importance. In the last part of the project, data from slaughter will be used together with flock data registered from hatch to slaughter, in a systematic search for possible correlations between condemnations and specific factors during hatch and rearing.

The project, financed by the Swedish Farmers Foundation (SLF) and coordinated by Helena Wall, involves researchers at SLU and SVA (National Veterinary Institute).

HELENA WALL, DEPARTMENT OF ANIMAL NUTRITION AND MANAGEMENT, SLU



PHOTO: HELENA WALL, SLU

Feeding gilts for breeding



PHOTO: JENNY SYNNAS GILNER, SLU

Pi About 50% of the breeding sows have to be replaced each year, so obviously sow longevity needs to improve. The feeding regime during rearing might be one tool to affect longevity. Current goals for gilt rearing are to produce gilts for mating at 2nd-3rd oestrus, 230 days of age, 140 kg live weight (LW) and

12-13 mm ultrasonic backfat.

In our study from Lövsta research centre we compared two dietary lysine levels (0.83 or 0.57 g sid lys per MJ NE) and two feed allowances (the Swedish standard for finishers or 90 % of this) in a 2×2 factorial trial comprising 80 crossbred gilts from 30 kg LW to service. Gilts were weighed and

their backfat measured repeatedly. Gilts were scored for conformation at 3 occasions. Half of the gilts were slaughtered at least 30 days after service. At slaughter reproductive organs and front legs were collected, so we could count number of ovulations and fetuses, and score elbow joints for osteochondrosis.

We found that higher lysine level increased growth rate during rearing, which the higher feed allowance did not. Higher lysine level tended to decrease backfat, and resulted in lower osteochondrosis scores. We found no differences in the early reproduction measured as number of ovulations and fetuses.

Currently recommended goals to produce gilts for mating were met for live weight (140 kg) but our gilts were thinner (10 vs 12-13 mm) and younger (200 vs 230 days) when mated at 2nd oestrus. They grew faster than the standard!

MARIA NEIL, DEPARTMENT OF ANIMAL NUTRITION AND MANAGEMENT, SLU

Fungi and mussels in diets for fish



Aquaculture today is producing nearly 50% of all fish consumed globally. However, the aquaculture industry has been highly dependent on the use of non-renewable resources such as fish-meal for production of aquaculture feeds. Despite recent advances in feed formulation, the pressure on wild fish stocks for production of fish-meal is not decreasing due to the rapid growth of aquaculture. Furthermore, the global population growth is increasing the need for arable land, the same land currently used for production of alternative plant sources that fuels the aquaculture feed industry. Therefore, there is a necessity for a different approach towards solving these emerging issues.

Fungi, such as yeasts and filamentous fungi possess high protein content and favorable amino acid profiles. They can be grown on industrial waste products, do not compete with human food sources, and pose no demand on arable land for their production.

The PhD thesis "Fungal and Mussel Protein Sources in Fish Feed: Nutritional and Physiological Aspects" studied the effects of three fungal protein sources



To find alternative protein sources for aquaculture feeds is crucial for a sustainable development of aquaculture. Photo: A. Vidakovic.

(baker's yeast, zygomycete fungi and a special yeast mix) and blue mussel on digestibility, growth performance and physiological status of Eurasian perch (*Perca fluviatilis*), Arctic charr (*Salvelinus alpinus*) and Rainbow trout (*Onchorhynchus mykiss*). Baker's yeast, yeast mix and blue mussel in fish feed successfully replaced 40% of fish meal in diets for charr and trout without affecting the growth performance. Use of baker's yeast and yeast mix in rainbow trout did not affect the blood plasma amino acid profiles. Somewhat decreased

digestibility of baker's yeast and yeast mix was attributed to presence of cell wall material in the yeast. Findings indicate that a high potential of baker's yeast, yeast mix and blue mussel in fish feed is possible as they can already be used to replace 40% of fish meal in diets to several fish species although further research is required to optimize some of these protein sources in fish diets.

ALEKSANDAR VIDAKOVIC, DEPARTMENT FOR ANIMAL NUTRITION AND MANAGEMENT, SLU

Genetic association between leg conformation in young pigs and sow reproduction



PHOTO: JENNY SVENNAS GILLNER, SLU

Longevity is important in pig production regarding both economic and ethical aspects. Direct selection for longevity might be ineffective because "true" longevity can only be recorded when a sow has been culled or died. Thus, indirect selection for longevity through other traits that can be recorded early in life and that are genetically correlated

with longevity might be an alternative. Leg conformation has been included in many breeding schemes for a number of years. However, the proof that leg conformation traits are good early indicators for longevity still is missing.

The genetic associations between leg conformation traits of young (5 months; 100 kg) Swedish Yorkshire pigs in nucle-

us herds and longevity traits of sows in nucleus and multiplier herds was analyzed. Data included 97,000 animals with information on conformation (Movement and Overall score) recorded at performance testing; and 27,000 sows with information on longevity. The longevity traits were: stayability from 1st to 2nd parity (STAY12); lifetime number of litters (NoL); lifetime number of born alive piglets (LBA). All estimated genetic correlations between conformation and longevity traits were significant and favorable (better leg scores result in better longevity). Heritabilities and genetic correlations between conformation and longevity indicate that selection on leg conformation should improve sow longevity.

LE HONG THU, PHD-STUDENT, DEPARTMENT OF ANIMAL BREEDING AND GENETICS, SLU

Advisory board: Katja Nilsson, Elise Norberg, Nils Lundheim. Another study by Thu Le Hong is now submitted for publication, however still being at the stage of peer-review.



PHOTO: JENNY SWENNAS GILLNER, SLU

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What causes diarrhoea in newborn piglets?

V An increased problem with diarrhoea in newborn piglets has been reported from a number of countries but the cause of this “new” diarrhoea is still an enigma. We have investigated the presence of pathological changes, passive immune status and presence of common bacterial causes of piglet diarrhoea in 50 diarrhoeic and 19 healthy piglets from 10 affected Swedish herds.

The passive immune status did not differ between diarrhoeic and healthy piglets, as indicated by similar concentrations of γ -globulin in serum. Porcine enterotoxigenic *Escherichia coli* (ETEC) was only found in two out of 50 piglets with diarrhoea and further virulence gene profiling of isolates from diarrhoeic pigs did not suggest involvement of other diarrhoeogenic types of *Escherichia coli*. *Clostridium* (C.) *perfringens* type C, the cause of necrotizing enteritis, was not detected and neither C. *perfringens* type A, nor C. *difficile* were associated with the presence of diarrhoea. Investigation of the intesti-

nal virome (presence of viruses in the gut) is currently ongoing together with Oskar Karlsson (SLU).

We have previously reported an unexpected association between diarrhoea in newborn pigs and colonisation of the small intestine by enteroadherent *Enterococcus hirae*. This association was strengthened by the present results which rule out well-known bacterial enteropathogens as significant contributors to the investigated diarrhoea.

The study was recently published in *Journal of Medical Microbiology* (JMM). Collaborators in the study were Magdalena Jacobson (SLU), Ronny Lindberg (SLU), Anna Aspán (NVI), Rodrigo Grandon (SLU), Nils Fall (SLU), Viveca Båverud (NVI) and Jenny Larsson (SLU). The study was funded by the Swedish Farmers' Foundation for Agricultural Research, the Swedish foundation for Pig Research and Magnus Bergvall's foundation.

TEXT: JENNY LARSSON, DEPARTMENT OF CLINICAL SCIENCES, SLU.

