

# 2021 Taiwan and Poland Bilateral Animal Industry International Video Conference

2021年臺灣波蘭動物產業視訊國際研討會

2021/2/4 Thu — 2/5 Fri

TW (GMT+8) 15:00-19:00 | PL (GMT+1) 08:00-12:00



Livestock Research Institute (LRI),  
Council of Agriculture, Executive Yuan, Taiwan  
臺灣行政院農業委員會畜產試驗所

Organizer



National Research Institute of Animal Production  
(IZ PIB), Poland  
波蘭國家動物生產研究所



# **BOOK OF ABSTRACTS**

## **Taiwan and Poland Bilateral Animal Industry International Video Conference**

**4, 5 February 2021**

**TW (GMT +8h) 15.00-19.00**

**PL (GMT +1h) 8.00-12.00**

**MSTemas**

# CONFERENCE AGENDA

DAY 1 - Feb. 4, 2021 (Thu.)

Time		min	Events / Topic 項目/主題	Speaker 講者
PL	TW			
08:00	15:00	15	Opening Remarks 開幕致詞	Dr. Krzysztof Duda Dr. Sylwester Świątkiewicz Section Chief Ming-Chuan Chung農委會國際合作科 鍾明娟科長 Dr. Jeng-Fang Huang 黃振芳所長
Session 1 Animal Genetic Resources				Chairperson: Dr. Kacper Żukowski Dr. Lih-Ren Chen 陳立人組長
08:15	15:15	15	Topic 1-1 Research on Farm Animal Genetic Resources in Poland (PL)	Dr. Grażyna Polak
08:30	15:30	15	Topic 1-2 Ex-situ Conservation of Biological Materials Derived from Polish Native Livestock Breeds - The Role of the National Research Institute of Animal Production in Poland (PL)	Dr. Monika Trzcińska Dr. Marcin Samiec
08:45	15:45	15	Topic 1-3 Conservation and Research on Farm Animal Genetic Resources in Taiwan (TW)	Dr. Der-Yuh Lin 林德育博士
Session 2 Animal Molecular Genetic				Chairperson: Dr. Kacper Żukowski Dr. Lih-Ren Chen 陳立人組長
09:00	16:00	15	Topic 2-1 Cell Models in Aid for Disease Research (PL)	Dr. Wojciech Witariski
09:15	16:15	15	Topic 2-2 Therapeutic Application of Porcine Induced Pluripotent Stem Cells in Human Diseases (TW)	Dr. Yu-Jing Liao 廖御靜博士
09:30	16:30	15	Topic 2-3 Transcriptomic Evaluation of Molecular Processes Associated with Meat Quality and Growth Traits in Poultry (broiler chickens and geese) (PL)	Dr. Katarzyna Piórkowska
09:45	16:45	15	Topic 2-4 microRNA Expression Profiling in Livestock in Terms of Relationships with Functional Traits, Disease States and the Effect of Nutritional Additives (PL)	Dr. Klaudia Pawlina-Tyszko

10:00	17:00	15	Topic 2-5 MicroRNA Expression in Early Development Level of Chicken Embryos (TW)	Ms. Hsiao-Yun Kuo 郭曉芸助理研究員
10:15	17:15	15	Topic 2-6 Genetic Architecture of Quantitative Traits and Complex Diseases, from Studies to Genomic Breeding Value Estimation (PL)	Dr. Kacper Żukowski
10:30	17:30	15	Topic 2-7 Detection of QTL for Production Traits Related to Adaptation to Sub-optimal Climate Conditions in Chickens (TW)	Dr. Ching-Yi Lien 練慶儀博士
Session 3 Feed Additives				Chairperson: Dr. Sylwester Świątkiewicz Dr. Churng-Faung Lee 李春芳副所長
10:45	17:45	15	Topic 3-1 Feed Supplements Enhancing the Production of Pigs – Effect on Development of the Digestive Tract, Nutrients Utilization, Meat quality and Health Status (PL)	Dr. Małgorzata Świątkiewicz
11:00	18:00	15	Topic 3-2 Effects of Dietary Supplementation of Two-Stage Solid-State Fermentation Probiotic Powder on Growth, Immunity, Blood Biochemistry and Carcass Performance in Finishing Pigs (TW)	Mr. Hsien-Juang Huang 黃憲榮助理研究員
11:15	18:15	15	Topic 3-3 Novel Metabolic Molecules Producing Lactobacilli Feed Additive Protects LPS-induced Immune Stress in Pig (TW)	Dr. Yu-Chun Lin 林幼君博士
11:30	18:30	15	Topic 3-4 Nutritional Methods of Coccidiosis Prophylaxis in Broiler Chickens (PL)	Dr. Anna Arczewska-Włosek, Dr. Sylwester Świątkiewicz
11:45	18:45	15	Topic 3-5 Functional and Mechanistic Studies of Rotam-CS for Coccidiosis in Boilers (TW)	Dr. Wen-Chin Yang 楊文欽博士
12:00	19:00	15	Topic 3-6 Effects of Feed Additives on Growth Performance in Pigs (TW)	Dr. Heng-Fu Lee 李恒夫博士
12:15	19:15	15	Moderated Discussion 意見交流	Chairperson: Dr. Sylwester Świątkiewicz Dr. Churng-Faung Lee 李春芳副所長

DAY 2 - Feb. 5, 2021 (Fri.)

Time		min	Events / Topic 項目/主題	Speaker 講者
PL	TW			
			<p>Session 4 Agri-Food Industry and Animal</p>	<p>Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長</p>
08:00	15:00	15	<p>Topic 4-1 The Use of Agri-food Industry By-products in Feeding Pigs (PL)</p>	<p>Dr. Małgorzata Świątkiewicz</p>
08:15	15:15	15	<p>Topic 4-2 Using Sweet Potato (TNG No.66) and Feed Rice (Taichung Sen No.17 rice) to Substitute the Corn in Diets on Growth Performance and Carcass Characteristics of Black Pigs (TW)</p>	<p>Dr. Chin-Meng Wang 王錦盟博士</p>
			<p>Session 5 Heat Stress and Environmental Enrichment</p>	<p>Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長</p>
08:30	15:30	15	<p>Topic 5-1 The Effects of Environmental Enrichment in Eaned Piglets (PL)</p>	<p>Dr. Dorota Godyń</p>
08:45	15:45	15	<p>Topic 5-2 New Cooling Technologies to Alleviate Heat Stress in Livestock (TW)</p>	<p>Dr. Hsiu-Wen Ou 歐修汶博士</p>
			<p>Session 6 Inbreeding Status of Holstein Cattle</p>	<p>Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長</p>
09:00	16:00	15	<p>Topic 6-1 Inbreeding in Holstein Friesians (HF) Cattle (PL)</p>	<p>Dr. Piotr Topolski</p>
09:15	16:15	15	<p>Topic 6-2 Inbreeding within Dairy Holstein in Taiwan (TW)</p>	<p>Mr. Jih-Yi Chen 陳志毅助理研究員</p>
			<p>Session 7 Productions and Goose</p>	<p>Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長</p>
09:30	16:30	15	<p>Topic 7-1 Effect of Rearing System on Productivity and Quality of Goose Meat (PL)</p>	<p>Dr. Katarzyna Połtowicz</p>
09:45	16:45	15	<p>Topic 7-2 Effect of Rearing System on Productivity and Quality of Goose Meat (TW)</p>	<p>Mr. Shih-Chieh Liao 廖士傑助理研究員</p>

Session 8 Industrial Issues				Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長
10:00	17:00	15	Topic 8-1 The Effect of Immunocastration on the Fattening, Slaughter and Meat Quality Parameters as an Alternative to Surgical Castration (PL)	Dr. Martyna Małopolska
10:15	17:15	15	Topic 8-2 Broiler Chicken Breast Muscle Myopathies - The Scale of the Problem, Causes and Prevention (PL)	Dr. Katarzyna Połtowicz
10:30	17:30	15	Topic 8-3 Achievements of Napiergrass Breeding in Taiwan (TW)	Ms. Tzu Rung Li 李姿蓉助理研究員
Session 9 Industrial Partner				Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長
10:45	17:45	15	Topic 9-1 Cattle Breeding in the Supervised Companies of National Support Center for Agriculture (PL)	Marcin Oszczapiński (KOWR)
11:00	18:00	15	Topic 9-2 Enhance Bilateral Business Opportunities between Poland and Taiwan (TW)	Mitagri Co., Ltd. 臺農發公司
11:15	18:15	15	Moderated Discussion 意見交流	Chairperson: Dr. Sylwester Świątkiewicz Dr. Churng-Faung Lee 李春芳副所長
11:30	18:30	15	Closing Remarks 閉幕致詞	Dr. Krzysztof Duda Dr. Jeng-Fang Huang 黃振芳所長





# Abstracts

DAY 1 - Feb. 4, 2021 (Thu.)

Session 1 Animal Genetic Resources				Chairperson: Dr. Kacper Żukowski Dr. Lih-Ren Chen 陳立人組長
08:15	15:15	15	Topic 1-1 Research on Farm Animal Genetic Resources in Poland (PL)	Dr. Grażyna Polak

## RESEARCH ON FARM ANIMAL GENETIC RESOURCES IN POLAND

Grażyna Polak

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Livestock breeding is, next to crop production, the basis of human nutrition. The processes related to animal production are aimed, on the one hand, at their improvement of production, but on the other hand, at reducing genetic variability. In recent decades, research related to animal production has focused both on improving the efficiency and the protection of genetic resources. In Poland, research in this area is carried out by research institutes within the Polish Academy of Sciences, National Research Institutes, agricultural and life science universities. The National Research Institute of Animal Production, operating in Krakow, conducts research on a wide range of issues, such as reproduction biotechnology and cry conservation, molecular biology, animal nutrition and feed science, and is the only research institution responsible for coordinating activities in the field of the protection of genetic resources of farm animals. Currently, Poland's breeding programs cover 167 mammalian and poultry breeds and 52 bee breeding lines, 83 of which are covered by protection programs due to the decreasing number. These are native and local breeds, which, despite their low productivity, have a unique cultural value and allow food production with high organoleptic and nutritional values.

Key Words: Livestock, Genetic resources

08:30	15:30	15	Topic 1-2 Ex-situ Conservation of Biological Materials Derived from Polish Native Livestock Breeds - The Role of the National Research Institute of Animal Production in Poland (PL)	Dr. Monika Trzcńska Dr. Marcin Samiec
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## *EX SITU* CONSERVATION OF BIOLOGICAL MATERIALS DERIVED FROM POLISH NATIVE LIVESTOCK BREEDS - THE ROLE OF THE NATIONAL RESEARCH INSTITUTE OF ANIMAL PRODUCTION IN POLAND

Monika Trzcńska, Marcin Samiec

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Development and optimization of innovative reproductive biotechnologies in farm livestock animals, which are based on modern approaches applied among others to cryopreserving and assessing semen and embryos, creating biorepositories of cryopreserved somatic cells and generating cloned embryos by somatic cell nuclear transfer, seem to be inevitable for conservation of genetic resources. These efforts also appear to be indispensable for establishment of the genetic reserves of near-threatened, vulnerable, endangered, critically imperilled and vanishing Polish native breeds. Moreover, this is a *sine qua non* condition for restoring and expanding rare conservative breeds of livestock species to perpetuate biological diversity and to enhance genetic variability. It is also worth noting that the above-mentioned attempts are required to reconstitute and reintroduce extinct breeds into the anthropogenic agricultural ecosystems. Therefore, the primary purpose of our presentation is to provide the knowledge deciphering recent efforts undertaken to realize programs focused on the *ex situ* conservation of Polish indigenous cattle and pig breeds. The secondary objective of current lecture is to emphasize the prominent role played by National Research Institute of Animal Production for maintaining biodiversity in agricultural environment niches. Summing up, after making the transition from basic to applied research, the strategies used for not only germplasm-carrier biological material banking, spermatological diagnostics and semen-based assisted reproductive technologies but also somatic cell banking and somatic cell cloning in livestock animals could display a large application potential in the development of science and economy in Poland through its use in agriculture and fields of interdisciplinary research.

Key Words: Livestock, Reproductive Biotechnologies, Biodiversity

08:45	15:45	15	Topic 1-3 Conservation and Research on Farm Animal Genetic Resources in Taiwan (TW)	Dr. Der-Yuh Lin 林德育博士
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## CONSERVATION AND RESEARCH ON FARM ANIMAL GENETIC RESOURCES IN TAIWAN

Der-Yuh Lin, Yung-Yu Lai, and Ming-Che Wu

Breeding and Genetics Division, Livestock Research Institute, Council of Agriculture, Executive Yuan

The livestock industry is an important agricultural industry in Taiwan, accounting for nearly 32% of agricultural output value. There are 18 species of farm animals in Taiwan, with a total of 135 breeds and lines, including 25 native varieties, 71 foreign varieties, and 39 new varieties produced through breeding methods. In 1987, the native breed livestock conservation farms were set up in the Livestock Research Institute (LRI) and National Universities, respectively, to investigate the characteristics of native farm animals and maintain small ethnic group conservation. In 2004, the Taiwan Animal Germplasm Center in LRI was established, with cell cryopreservation equipment, Animal Genetic Resources Information Network (AGRIN), livestock breeding databases, and a genetic resource research and analysis laboratory, to develop the techniques of farm animal germ cell cryopreservation, and to establish cell banks of frozen sperm and frozen embryos. At present, the cryopreservation of 17 species genetic materials and the germ cells of 9 native farm animals have been completed. We also apply molecular genetic markers to analyze the genetic diversity of farm animals, and establish a genotyping platform for related species. In the future, we will continue to maintain the genetic resources of farm animals, optimize the AGRIN, integrate regional livestock genetic resource information and establish a national database of livestock biodiversity, promote international exchanges of the genetic resources, and facilitate the internationalization of Taiwan's breeding farm animal industry to achieve the goal of sustainable operation and utilization.

Key Words: Taiwan, Farm Animal, Genetic Resources

Session 2 Animal Molecular Genetic				Chairperson: Dr. Kacper Żukowski Dr. Lih-Ren Chen 陳立人組長
09:00	16:00	15	Topic 2-1 Cell Models in Aid for Disease Research (PL)	Dr. Wojciech Witariski

## CELL MODELS IN AID FOR DISEASE RESEARCH

Wojciech Witariski

Department of Animal Molecular Biology, National Research Institute of Animal Production, Balice, Poland  
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The rapid development of in vitro cell cultures widened possibilities for modelling of disease. 2D cell cultures and 3D models offer many advantages: 1) allow experiments with similar-to-in vivo conditions; 2) retain 3D structure and properties, 3) shows stable and monitored conditions, 4) are attainable in high throughput scale, 5) simulate complex processes like cancerogenesis with tumour cells selection 6) consist of different cell types with the other function. In our research, we utilise several cellular models dedicated to finding solutions related to animal health. Primary horse chondrocyte cell line is used to examine epigenetic modifications due to ageing processes, and senescence-related changes also observed in degenerative diseases (i.e. osteoarthritis). Horse sarcoid is benign skin neoplasia caused by the activity of bovine papillomaviruses. Due to its frequent recurrence, disease decreases animal well-being and cause significant damage to animal breeding. To find a solution to this problem, we continuously develop cancer primary cell lines to examine their oncogenic changes on the several levels of organisation of information. Simultaneously, we construct engineered cell lines to express viral proteins, or in future, whole viral genome. Porcine intestine organoids were developed to examine tissue properties changes (i.e. permeability) and corresponding RNA expression pattern. Organoids are a research model to investigate the influence of several food additives on the cellular level. In vitro cell cultures are successfully used in pharmacological sciences, in cancer research and other complex models. They are also utilised in personalised medicine (diagnostics) as well as in regenerative medicine.

Key Words: Cell model, Disease modelling, Animal health, Livestock

09:15	16:15	15	Topic 2-2 Therapeutic Application of Porcine Induced Pluripotent Stem Cells in Human Diseases (TW)	Dr. Yu-Jing Liao 廖御靜博士
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## THERAPEUTIC APPLICATION OF PORCINE INDUCED PLURIPOTENT STEM CELLS IN HUMAN DISEASES

Yu-Jing Liao<sup>(1)</sup> and Jenn-Rong Yang<sup>(2)</sup>

<sup>(1)</sup>Division of Physiology, Livestock Research Institute, Council of Agriculture, Executive Yuan

<sup>(2)</sup>Kaohsiung Animal Propagation Station, Livestock Research Institute, Council of Agriculture, Executive Yuan

The development of induced pluripotent stem cell (iPSCs) technology has accelerated the research of basic and clinical medicine, especially drug screening and cell therapy. By this technology, cells derived from the subjects are able to transform into iPSCs, as a platform specific to the subjects for drug screening and cell therapy. Compared with rodent iPSCs, pig iPSCs possess much similar characteristics to human iPSCs, and therefore research on pig iPSCs benefits the understanding of human diseases and the development of treatments. Our Institute successfully established pig induced pluripotent stem cells (piPSCs) from porcine ear fibroblasts in 2014. Next, we attempted to differentiate piPSCs into osteoblasts for the study of cell therapy in the rat and pig models of osteoporosis. The results show that cell therapy not only promotes the growth of trabecular bones in rat femurs and Lanyu pig tibiae, but also induces bone regeneration at transplanted sites, indicating that bone loss resulted from osteoporosis has been ameliorated. Thus, iPSCs have a great potential for disease treatment; however, how to improve pluripotency potential is still the biggest challenge so far.

Key words: Induced Pluripotent Stem Cells, Pigs, Cell Therapy

09:30	16:30	15	Topic 2-3 Transcriptomic Evaluation of Molecular Processes Associated with Meat Quality and Growth Traits in Poultry (broiler chickens and geese) (PL)	Dr. Katarzyna Piórkowska
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## TRANSCRIPTOMICS EVALUATION OF MOLECULAR PROCESSES ASSOCIATED WITH MEAT QUALITY AND GROWTH TRAITS IN POULTRY

Katarzyna Piórkowska

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Transcriptomics is the transcriptome study - the complete set of RNA transcripts produced by the genome under specific circumstances or in particular cells or tissues. The most popular methods used in transcriptomic are high-throughput methods, such as microarray analysis and RNA sequencing next-generation sequencing (NGS). The selection for growth rate (GR) and slaughter weight (SW), especially in poultry chickens achieved success because today slaughter weight is over 4-fold higher than it was a half-century ago. However, in Poland, we struggle with a highly non-uniform poultry population, especially in broiler chickens and geese regarding GR and SW. This excessive GR in chickens is associated with meat defects such as green, white stripping muscle, wooden breast and spaghetti meat. In turn, in geese, excessive SW leads to the problem with meat processing. Our studies conducted for a few years using transcriptome analysis try to identify molecular processes, gene candidates, and possible biomarkers associated with meat quality and GR in chicken and geese. Our first study evaluated breast muscle transcriptome dependent on meat quality (shear force as determinant). We selected four gene candidates that in our opinion, play a significant role in the chicken meat quality – AVD, PLIN1, THRSP and ABS2a. The next study conducted in chickens and subsequently in geese considered molecular processes activated in the hypothalamus and pituitary in response to differences in GR. In broiler chicken, the gene candidate was POMC encodes the precursor of alpha-melanocyte-stimulating hormone ( $\alpha$ -MSH) that play a significant role in regulating feed intake. In turn for geese, evaluating the hypothalamic-pituitary axis, FOS gene was recommended as candidate-related to GR.

Key Words: Poultry, RNASeq, Meat quality, Growth traits

09:45	16:45	15	Topic 2-4 microRNA Expression Profiling in Livestock in Terms of Relationships with Functional Traits, Disease States and the Effect of Nutritional Additives (PL)	Dr. Klaudia Pawlina-Tyszko
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## MICRORNA EXPRESSION PROFILING IN LIVESTOCK IN TERMS OF RELATIONSHIPS WITH FUNCTIONAL TRAITS, DISEASE STATES AND THE EFFECT OF NUTRITIONAL ADDITIVES

Klaudia Pawlina-Tyszko

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In recent years, intensive research has been conducted on microRNAs, which belong to the class of small non-coding RNAs. Despite the fact that they do not code for proteins, they are able to orchestrate gene expression at the post-transcriptional level. Owing to their ability to target and regulate the expression of hundreds of genes, they are indirectly engaged in a plethora of biological processes, crucial for i.a. apoptosis, development and proliferation. Therefore, they are considered to be important regulators of cell functioning. Additionally, they can serve as potential biomarkers for diagnosis and prognosis, because of a correlation between expression of a specific miRNA and given phenotype, such as functional traits or diseases. The knowledge of microRNAs in various species is constantly being acquired, however, livestock species still stay behind. Thus, our research focuses on broadening the available repertoire of microRNAs in animal species, with a special attention to livestock. To this end, we apply i.a. high throughput technologies, such as Next Generation Sequencing, to identify potentially novel miRNAs. Moreover, given the significance of miRNAs in genetic bases of important economic traits such as meat content and fat deposition, we aim to search for key regulators of these processes in the class of miRNAs. Furthermore, miRNAs vital for different disease states, e.g. cancer or cellular processes have also been investigated. Obtained results not only provide potential candidate and biomarker miRNAs but also give insight into mechanisms underlying the functioning of the examined tissues and their associations with different features and phenotypes.

Key Words: miRNA, Livestock, Biomarker, Disease

10:00	17:00	15	Topic 2-5 MicroRNA Expression in Early Development Level of Chicken Embryos (TW)	Ms. Hsiao-Yun Kuo 郭曉芸助理研究員
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## MICRORNA EXPRESSION IN EARLY DEVELOPMENT LEVEL OF CHICKEN EMBRYOS

Hsiao-Yun, Kuo

Physiology Division, Livestock Research Institute, Council of Agriculture, Executive Yuan, Taiwan

MicroRNAs (miRNAs) are small, non-coding RNA that mostly regulate mRNA translation by binding with the 3' untranslated region (3' UTR) of complementation sequence of mRNAs. miRNAs have tissue-specific expression and participate every levels of embryos development in vertebrates. In this study, miRNAs were detected from fertilized chicken egg at stage X to demonstrate miRNA expression profile and biogenesis pathways in chicken early embryos. A total of 765 miRNAs were obtained from miRNA library of stage X chicken embryos by next generation sequencing. Among 765 miRNAs, 683 miRNAs were identified in male embryos, of which 101 were male-specific miRNAs, and 664 miRNAs in female embryos, of which 82 were female-specific miRNAs. There were 44 identified embryonic miRNAs significantly differential expressed between male and female embryos, which 23 miRNAs had significantly higher expression in male embryos whereas 21 miRNAs had significantly higher expression in female embryos. In enrichment pathway analysis, most differences expression miRNAs in male and female embryos participated in the biosynthesis of unsaturated fatty acids pathway. This study presents several candidates for future studies concerning the role of miRNAs on regulation of chicken early embryonic development.

Key Words: Chicken Embryo, MicroRNA, Next Generation Sequencing



10:15	17:15	15	Topic 2-6 Genetic Architecture of Quantitative Traits and Complex Diseases, from Studies to Genomic Breeding Value Estimation (PL)	Dr. Kacper Żukowski
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## GENETIC ARCHITECTURE OF QUANTITATIVE TRAITS AND COMPLEX DISEASES, FROM STUDIES TO GENOMIC BREEDING VALUE ESTIMATION

Kacper Żukowski

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The quantitative traits and complex diseases can and usually do have diverse genetic architecture. To be more strict, quantitative traits depend more on how the genetic variation is determined by the additive, dominant and epistatic components. This determination is more complicated if the traits' inheritance depends on multiple genes; in many cases, polygenic genes. On the other hand, there are 'simple' casual mutations (or haplotypes), often located in one or only a few candidate genes, and this is how the phenotype is determined. Before 2000, a comprehensive approach to study the genetic background of traits seemed impossible. This was the main reason for the lack of appropriate molecular biology and bioinformatics tools, such as genotyping and sequencing at different omic levels. In animal sciences, the best outcome of this type of research appears to be large-scale genomic selection, mainly of dairy cattle. In animal science, genomic selection introduced ten years ago on a large scale seems to be the best fruit of this type of research. In dairy cattle, these results are used by breeders worldwide in the form of semen straws of bulls evaluated and selected using the genome. The selection itself is made using several quantitative and genetic traits based on different genetic backgrounds. The National Institute of Animal Production has been involved in genomic selection projects in Poland since 2008. The Institute is currently associated with the EuroGenomics cooperative, which has the largest reference population in Holstein breed with more than 35,000 genotyped bulls, all daughter proven across Europe. These efforts increased the reliability of genomic breeding values in 11 countries comprising more than 10 million Holstein cows.

Key Words: Cattle, Genomics, QTLs, casual mutations

10:30	17:30	15	Topic 2-7 Detection of QTL for Production Traits Related to Adaptation to Sub-optimal Climate Conditions in Chickens (TW)	Dr. Ching-Yi Lien 練慶儀博士
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## DETECTION OF QTL FOR PRODUCTION RELATED TO ADAPTATION TO SUB-OPTIMAL CLIMATE IN CHICKENS

Ching-Yi Lien

Chunghwa Animal Propagation Station, Livestock Research Institute, Council of Agriculture, Executive Yuan

Quantitative trait locus (QTL) detection is an effective approach to better understand the genetic architecture of complex traits and unravel genomic regions which are controlling quantitative variation of traits. The analysis aimed at identifying QTL that control productive performance under humid sub-tropical conditions in chickens. Indeed, QTL regions affecting growth-related traits can be used as indicators of adaptation to sub-optimal conditions. A QTL detection project was set up in the real conditions of the humid sub-tropical climate in Taiwan, using an F2 population of 743 individuals produced by crossing the Taiwan Country chicken L2 line with an experimental line of Rhode Island Red layer R-. To assess adaptation to sub-tropical climate, a set of relevant traits was recorded including growth, immune response, egg production, egg quality, residual feed consumption, body composition, and meat quality. Our results showed that the whole-genome QTL analysis led to the identification of 112 QTL that corresponded to 100 non-overlapping regions which may influence adaptation of chickens to varying environmental conditions. Among the 112, 38 exhibited genome-wide significance ( $P \leq 4.84 \times 10^{-6}$ ). Most of the QTL regions detected for growth traits overlapped with previously published QTL, which suggests that these QTL have an effect across a range of environmental conditions and could be particularly useful for selection.

Key Words: QTL, Climate Adaptation, Chicken

Session 3 Feed Additives				Chairperson: Dr. Sylwester Świątkiewicz Dr. Churng-Faung Lee 李春芳副所長
10:45	17:45	15	Topic 3-1 Feed Supplements Enhancing the Production of Pigs – Effect on Development of the Digestive Tract, Nutrients Utilization, Meat quality and Health Status (PL)	Dr. Małgorzata Świątkiewicz

## FEED SUPPLEMENTS ENHANCING THE PRODUCTION OF PIGS – EFFECT ON DEVELOPMENT OF THE DIGESTIVE TRACT, NUTRIENTS UTILIZATION, MEAT QUALITY AND HEALTH STATUS

Małgorzata Świątkiewicz, Magdalena Szyndler-Nędza  
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Intensive selection has been carried out to improve the carcass meatiness and weight gains of modern fattening pigs. However, the quality characteristics of the meat have deteriorated. Besides, the total ban on the use of antibiotic growth promoters has prompted the search and use of other feed additives, those of natural origin becoming especially popular. We observed positive effects on meat, including juiciness and tenderness, improved colour, taste and water holding capacity, increased n3-PUFA and meat antioxidant capacity. In piglets' case, the antibacterial activity, higher SCFA in ileum content, and longer villi were observed when acidifiers, herbs, or probiotics were used. The new experiment assessed the possibility of using domestic fibrous plants as a fiber supplement for piglets and feed supplement with health-promoting properties. The effectiveness of the examined supplements was dependent on the piglets' age. The multi-component and multifunctional feed additives are promising. The native breed pigs are characterized by good health and high meat quality, which predisposes them to produce traditional regional products. However, because of the slower growth rate and greater fatness, this breed's potential has not been properly used. Our project is aimed to develop a complete feeding system for native breed pigs (in the form of a coherent procedure including the composition of the feed mixture and the recommended slaughter weight) and an innovative feed additive of local plant origin that allows obtaining a high-quality product.

Key words: pig feeding, dietary supplements, meat quality, native breed

11:00	18:00	15	Topic 3-2 Effects of Dietary Supplementation of Two-Stage Solid-State Fermentation Probiotic Powder on Growth, Immunity, Blood Biochemistry and Carcass Performance in Finishing Pigs (TW)	Mr. Hsien-Juang Huang 黃憲榮助理研究員
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## EFFECTS OF DIETARY SUPPLEMENTATION OF TWO-STAGE SOLID-STATE FERMENTATION PROBIOTIC POWDER ON GROWTH, IMMUNITY, BLOOD BIOCHEMISTRY AND CARCASS PERFORMANCE IN FINISHING-PHASE OF THE KHAPS HYBRID BLACK PIGS

Hsien-Juang Huang <sup>(1)(2)</sup> Yan-Der Hsu <sup>(2)</sup> Cheng-Yung Lin <sup>(3)</sup> and Kuo-Lung Chen <sup>(4)</sup>

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This study was to investigate the effects of dietary supplementation of two-stage solid-state fermentation probiotic powder (TSFP) on growth, immunity, blood biochemistry and carcass performance in finishing-phase of the native hybrid black pigs. To prepare TSFP, soybean based feed was firstly fermented with *Bacillus subtilis natto* N21, *Bacillus amyloliquefaciens* Da16, *Bacillus sp.* Da15, *Providencia rettgeri* Da6 and *Bacillus sp.* Da2 and followed by the secondly acid-producing *Saccharomyces cerevisiae* Y10. Total 80 hybrid pigs of Duroc (D, ♀) × KHAPS black pig (K, ♂) hybrids (DK) in an average weight of 78 kg were selected and randomly assigned into four groups with 5 replications. Each replication contained 2 barrows and 2 gilts.

Experimental diets were the control group fed a corn-soybean meal based formula as the bulk of raw materials containing 3% fish meal, and the treatment diets were either replaced fish meal by additional 5% soybean meal, or substitution of 2.5% or 5% TSFP. Growth performance demonstrated dietary TSFP had improved daily feed intake, average daily weight gain, and feed conversion rate. When immunity was assessed, IFN- $\gamma$  level was significantly elevated ( $P < 0.05$ ), and lipopolysaccharide or concanavalin A activated lymphoblastogenesis were increased in pigs fed 5% TSFP diet. Blood biochemistry data demonstrated dietary 5% TSFP had improved plasma HDL-C level ( $P < 0.05$ ), and LDL-C and blood urea nitrogen level were significantly lower ( $P < 0.05$ ). The carcasses characteristics showed that dietary 5% TSFP had significantly elevated A values in longissimus dorsi muscle ( $P < 0.05$ ). Summed, plasma biochemistry, immunity and carcass performance could be improved by adding 5% TSFP supplementation in finishing pigs diet.

keywords: Finishing Pig, Growth, Immunity, Blood Biochemistry, Carcass, Fermentation

11:15	18:15	15	Topic 3-3 Novel Metabolic Molecules Producing Lactobacilli Feed Additive Protects LPS-induced Immune Stress in Pig (TW)	Dr. Yu-Chun Lin 林幼君博士
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## NOVEL METABOLIC MOLECULES PRODUCING LACTOBACILLI FEED ADDITIVE PROTECTS LPS-INDUCED IMMUNE STRESS IN PIG

Yu-Chun Lin

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Stress in piglet is a complex state particularly caused by environment, which contributes to reduction of pig health and lead to decrease animal productivity and growth efficiency. Thus, the control and prevention of stress and its related illnesses are important key factors affecting the profitability of the livestock industry. Recently, a growing interest of feeding animals with innovative feed additive, particularly by using functional probiotics which provide potential health promoting benefit to animals. In our present studies, a novel metabolic molecule exhibited anti-inflammatory properties expression as a cytoguardin that suppressed COX-2 expression in cancer cells was discovered by comparative metabolomics as an innate vasoprotective factor. To extend the findings in application of feed additive, one potential probiotics *Lactobacillus* strain Y310, originally isolated from raw milk, has been demonstrated highly produced with this novel metabolic molecule. We carried out the protective effect of this selected strain on against of lipopolysaccharide (LPS) induced endotoxemia and immune stress by using Lan-yu minipigs. The result indicated that animal fed a basal diet supplemented with Y310 suppressed the amount of LPS-induced bronchoalveolar lavage fluid and proinflammatory cytokine production as well as endotoxemic lung injury. In addition, a better beneficial effects of selected potential probiotics on growth performance and feed efficiency was noted after addition of the probiotic in commercial LD piglets by modulating putative links between key taxa and possible metabolic processes of the gut microbiota. Our data indicated that the selected probiotics with high production of novel metabolic molecule has potential on animal health promoting.

Keyword: Stress, Novel Metabolic Molecule, Anti-Inflammation, Lactic Acid Bacteria

11:30	18:30	15	Topic 3-4 Nutritional Methods of Coccidiosis Prophylaxis in Broiler Chickens (PL)	Dr. Anna Arczewska-Włosek, Dr. Sylwester Świątkiewicz
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## NUTRITIONAL METHODS OF COCCIDIOSIS PROPHYLAXIS IN BROILER CHICKENS

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A series of *in vivo* experiments was carried out to evaluate the effectiveness of nutritional methods in the prevention of coccidiosis in broiler chickens. Such studies were carried out in two directions: nutrition as an alternative method to in-feed coccidiostat or nutrition as a supportive factor in limiting the potential negative effect of the live anticoccidial vaccine on the growth performance of broiler chickens.

In the first stage, the effectiveness of selected individual extracts was studied in broilers challenged with *Eimeria spp.*, and extracts of garlic, sage, oregano, echinacea and thyme were chosen to compose a herbal extract blend, which was, subsequently, tested individually or in combination with other feed additives. Summing up, this herbal blend provided effective protection against the coccidiosis under conditions of low exposure to coccidia and alleviated the detrimental effect of severe infection in clinical coccidiosis and stimulated compensatory growth in recovering chickens. However, the combined use of the herbal blend with other tested feed additives, i.e. with a synbiotic, acidifier, chitosan or mannan oligosaccharide, worsened its effectiveness in acute disease conditions.

Regarding the effects of nutrition and immunoprophylaxis, the most effective nutritional strategies included: increased dietary crude protein level, diet supplementation with herbal extract blend, probiotic, and chitosan, which alleviated the negative effects of anticoccidial vaccination, without adversely affecting the process of recirculation of *Eimeria* vaccine strains, which in turn is necessary to produce post-vaccination immunity.

Key Words: Chickens, Nutrition, Immunity

11:45	18:45	15	Topic 3-5 Functional and Mechanistic Studies of Rotam-CS for Coccidiosis in Boilers (TW)	Dr. Wen-Chin Yang 楊文欽博士
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## FUNCTIONAL AND MECHANISTIC STUDIES OF ROTAM-CS FOR COCCIDIOSIS IN BOILERS

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Poultry accounts for 34% of protein food for humans with a yearly value of 60 billion USD. Coccidiosis is one of the most serious infectious diseases in chickens, leading to sick bird syndrome, bloody stools, gut lesions and mortality. This disease causes a global loss of 3 billion USD annually. Apart from chemicals and vaccines, phytochemicals are emerging as an alternative to control chicken coccidiosis in poultry industry.

First, we used morphological and molecular methods to characterize *Eimeria* species in broiler farms. Seven *Eimeria* species and their percentage were confirmed. Next, we studied the prophylactic effect of Rotam-CS, a phytochemical formulation, on coccidiosis in broiler farms. We found that Rotam-CS dose-dependently protected against coccidiosis as evidenced by reduction in mortality, fecal oocyst excretion and gut pathology in broilers. Finally, mechanistic studies indicated that Rotam-CS suppressed coccidiosis via inhibition of the oocyst sporulation and sporozoite invasion in coccidian life cycle. However, Rotam-CS failed to directly kill *Eimeria* oocysts.

Key Words: Coccidiosis, Broilers, Rotam-CS, Phytochemicals

12:00	19:00	15	Topic 3-7 Effects of Feed Additives on Growth Performance in Pigs (TW)	Dr. Heng-Fu Lee 李恒夫博士
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## EFFECTS OF FEED ADDITIVES ON GROWTH PERFORMANCE IN PIGS

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The global consumption of livestock product continues to increase along with the growth of population, and the efficiency of livestock production plays an important role. Many countries and areas, such as the European Union, have banned antibiotics for the purpose of promoting growth. The development of feed additives that can replace antibiotics has become an urgent issue of the industry. The innovation of feed additives can start with different approaches in terms of probiotics, organic acids and phytogenics. A number of feed additives for pigs have been developed at Livestock Research Institute, Taiwan. Studies have shown that diet supplemented with  $2 \times 10^5$  CFU/kg *Bacillus coagulans* S10 or 0.5% biochar vinegar could improve the growth performance for 4-week-old weaned piglets. Diet supplemented with 0.2% Hiram lemon powder could improve the feed efficiency of 4-week-old weaned piglets and tended to improve weight gain and feed efficiency for growing and finishing period. In summary, the growth performance of pigs could be improved through the application of probiotics, organic acid and phytobiotics. Further health-care feed additives should be developed more widely to improve the production efficiency in the future.

Key Words: Feed Additives, Growth Performance, Pigs



Session 4 Agri-Food Industry and Animal				Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長
08:00	15:00	15	Topic 4-1 The Use of Agri-food Industry By-products in Feeding Pigs (PL)	Dr. Małgorzata Świątkiewicz

## THE USE OF AGRI-FOOD AND BIOFUEL INDUSTRY BYPRODUCTS IN FEEDING PIGS

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The efficiency of DDGS in pig feeding was evaluated. In addition, we tested the NSP enzymes efficiency as well as the effect of different saturation of fat added to feed mixtures containing corn DDGS, on meat quality. The genes associated with lipid metabolism and their expression after different diets were also analyzed. It was observed that corn DDGS causes a reduction in the expression of genes involved in lipogenesis and cellular respiratory processes while stimulating the genes of the immune system as well as that the expression of genes involved in lipid metabolism is changed following dietary stimulation. In the future, we will explore the potential of corn DDGS as a health-promoting component of the diet. Currently, obesity or cardiovascular diseases have also started to affect domestic animals, such as dogs or cats. Corn DDGS seems to be a product that could partially counteract these disorders.

We evaluated the possibility of partial replacement of GMO soybean meal with rapeseed pressed cake. The fattening results did not deteriorate; neither did the quality of the meat and sow and piglets performance. Other trials showed that the combination of rapeseed pressed cake with legume seeds improves the protein quality, which allows for the complete elimination of soybean meal from the sows and fatteners diet. In the future we will search for innovative and/or developed technological methods, such as biological (fermentation) or baro-thermal ones, to reduce the content of antinutritive factors and improve the protein quality and digestibility in order to increase the content of rapeseed feeds in young animals diet.

Key words: pig feeding, by-products, DDGS, rapeseed cake.

08:15	15:15	15	Topic 4-2 Using Sweet Potato (TNG No.66) and Feed Rice (Taichung Sen No.17 rice) to Substitute the Corn in Diets on Growth Performance and Carcass Characteristics of Black Pigs (TW)	Dr. Chin-Meng Wang 王錦盟博士
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**USING SWEET POTATO (TNG NO.66) AND FEED RICE (TAICHUNG SEN NO.17 RICE) TO SUBSTITUTE THE CORN IN DIETS ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF BLACK PIGS**

Chin-Meng Wang

Animal Industry Division, Livestock Research Institute, Council of Agriculture, Executive Yuan

In Taiwan, the major feed ingredient of diets to feed pigs is to use corn and soybean meal, but most of corn and soybean rely on imports from other country. Using agri. by-products is not often in Taiwan, only few researches studied on applying agri. by-products in feeding pig diet. This topic is to introduce sweet potato and feed rice for feeding in black pig. The KHAPS black pigs were used as experimental animal. In the sweet potato study, the treatment groups were fed with the diet containing 18.8% sweet potato (TNG No. 66). In the feed rice study, treatment groups were fed with the diets substituting 50, 75 and 100% corn with feed rice (Taichung Sen No. 17). The results showed that has similar growth performance and carcass characteristics between treatment and control group. In summary, the feeding diet of black pig in Taiwan could apply sweet potato and feed rice to be feed ingredient to substitute corn.

Key words: Agriculture by-product, Black Pigs, Growth Performance.

Session 5 Heat Stress and Environmental Enrichment				Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長
08:30	15:30	15	Topic 5-1 The Effects of Environmental Enrichment in Eeaned Piglets PL)	Dr. Dorota Godyń

## THE EFFECTS OF ENVIRONMENTAL ENRICHMENT IN WEANED PIGLETS

Dorota Godyń

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The legislation regarding pig housing systems states that environmental enrichment needs to be provided for group-housed pigs. Moreover, the materials used for improving animal housing are categorized as optimal, suboptimal, and material of marginal interest. This study aimed to evaluate the effect of environmental enrichment on behaviour, daily weight gain and serum cortisol level in weaned piglets. The observations carried out on the 1, 2, 3rd day after weaning showed that providing the different materials improved animals activity, including exploratory behaviour towards objects placed in the pens and it causes increased frequency of feeding behaviour. Moreover, the daily weight gains were higher in groups with access to additional materials in the pens (evaluated within four weeks period). There were no significant differences between groups in term of the cortisol level (evaluated on the third day after mixing). It may be concluded that the provision of additional materials in pens improved animal welfare – which was showed in higher animal activity and performance.

Key Words: Pigs, Animal Housing, Toys

08:45	15:45	15	Topic 5-2 New Cooling Technologies to Alleviate Heat Stress in Livestock (TW)	Dr. Hsiu-Wen Ou 歐修汶博士
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## BARN COOLING TECHNOLOGY TO ALLEVIATE HEAT AND HUMIDITY STRESS FOR HOLSTEIN LACTATING COWS

Tzong-Faa Shiao, Der-Wei Yang, Chia-Jung Lee, Hsiu-Wen Ou\*, and Churng-Faung Lee  
Animal Industry Division, LRI, COA, Executive Yuan

Taiwan island locates in the subtropical area with high temperature and humidity all year round. Alleviating heat and humidity stress for dairy cows is the big issue in Taiwan. A tunnel-ventilated, water-padded free stall (TWP) barn was compared with a conventional free stall barn with fans and sprinklers (C+SP) for Holstein lactating cows. It showed that the day-time temperature inside the TWP barn was lower, but milk yield was lower than C+SP barn. By increasing double fans to promote air exchange and adding sprinklers at feeding alley, cow intake and milk yield could be improved. Furthermore, adopted the mist to replace water pad (TM), the temperature-humidity index (THI) could be decreased further, however the respiration rate and rectal temperature of cows still higher. Milk yield and physiological responses could be improved when cows were fed in TM barn during day time and in exercise ground during night time. This might be due to the lower THI environment at day time and open air exercise ground eliminated the long-time humidity stress for the other day. Livestock Research Institute had initiated the physical measurements for livestock during the cool and hot seasons from 2020. This basic information would help us to find the adaption strategy in reproduction and feeding management under extreme climate situation.

**Key Words:** Heat and humidity stress, Barn cooling, Holstein lactating cows

Session 6 Inbreeding status of Holstein Cattle				Chairperson: Dr. Sylwester Świątkiewicz Dr. Jen-Wen Shiau 蕭振文組長
09:00	16:00	15	Topic 6-1 Inbreeding in Holstein Friesians (HF) Cattle (PL)	Dr. Piotr Topolski

## INBREEDING IN THE POPULATION OF HOLSTEIN-FRIESIAN CATTLE

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Inbreeding has been used for almost three centuries to create and improve dairy cattle populations, but today it is one of the most controversial breeding methods. Some breeders perceive it in terms of risk to their herds' genetic merit, deterioration in productive traits, and consequently, generation of economic losses from farming. In contrast, other breeders view it as benefiting from the effective consolidation of the desirable characteristics of outstanding animals or increased herd uniformity. Inbreeding is often the subject of emotional debate among breeders and provokes opposing opinions. To make matters worse, regardless of what breeders think, they are often unaware of inbreeding in their herds or exercise improper control. Meanwhile, the population of Holstein-Friesian cattle is one of the most inbreeding breeds globally, and the average inbreeding of HF cattle is regularly increasing. The presentation analyses the possible consequences of inbred mating and its causes and compares the change in the dynamics of inbreeding in Polish Holstein-Friesian cattle and bred under both conventional and genomic breeding programmes.

**Key Words:** Holstein-Friesian cattle, Inbreeding, Conventional and Genomic Breeding

09:15	16:15	15	Topic 6-2 Inbreeding within Dairy Holstein in Taiwan (TW)	Mr. Jih-Yi Chen 陳志毅助理研究員
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## INBREEDING WITHIN DAIRY HOLSTEINS IN TAIWAN

Jih-Yi Chen, Chun-Hsuan Chao, Kuo-Hua Lee, and Jen-Wen Shiau

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Using frozen semen of proven bulls and artificial insemination are common practice to mate cows in Taiwan. Inbreeding arising due to the limited number of proven bulls was used. We have implemented the Dairy Herd Improvement (DHI) Program for 43 years in Taiwan. DHI herd accounts for about 26% of the dairy cows in the country. From 2008 to 2020, the average cattle number for milk test was 15,357 head (163 herds) . The ratio of the artificial insemination for dairy Holstein is about 82%. According to the imported bull frozen semen database, the importing countries were mainly the United States, Canada, Japan and Netherlands. In 2008, the import ratio was 37.2%, 53.9%, 3.5% and 5.5% from above countries. The most popular bull was NAAB code No. 200HO00044, which have been imported 22,730 doses (7.2%) , its genetic has a significant impact on the daughter performance in Taiwan. The pedigree data of the DHI database (n = 30,095) from 1993 to 2003 showed the coefficient of inbreeding ( $F_x$ ) was 2.39%. In addition, dairy cow hair follicle from 39 DHI herds from 2017 to 2020 (n = 1969) were sent to the Neogen laboratory in United States for genetic testing, the calculated  $F_x$  was 7.72%. The average annual inbreeding increase during this period was 0.21%. In summary, the widespread use of the popular bull for insemination from consanguineous ancestral groups led to the increasing inbreeding and there is a risk of inbreeding depression for Holstein cattle in Taiwan.

Key Words: Taiwan Holsteins, Bull, Frozen Semen, Coefficient of Inbreeding

Session 7 Productions and Goose				Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長
09:30	16:30	15	Topic 7-1 Effect of Rearing System on Productivity and Quality of Goose Meat (PL)	Dr. Katarzyna Póltowicz

## EFFECT OF REARING SYSTEM ON PRODUCTIVITY AND QUALITY OF GOOSE MEAT

Katarzyna Połtowicz, Paulina Potocka  
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Poland is one of the leading producers of goose meat in European Union. Goose meat production is based almost exclusively on commercial hybrids of two breeding lines of White Kołuda® Goose, originated from The National Centre for Research and Breeding of Geese in Kołuda Wielka which forms a part of the National Research Institute of Animal Production. The productivity, carcass traits, as well as some physicochemical parameters of breast and leg muscles are affected by many different factors including rearing system. A Polish specialty is production of oat-fed geese, which combines semi-intensive system of rearing with fattening with whole oat grain. The other rearing system is to produce young, table geese with slaughter age of 8-12 weeks of age, under intensive conditions. In turn, in the organic management system, geese are kept up to 24 weeks of age with access to natural pastures and swimming pool. Comparison of the results of 10-week-old geese from the intensive rearing and oat geese showed a highly significant effect of the rearing technology of White Koluda® Geese on slaughter weight, as well as on carcass weight. The geese from intensive rearing were characterized by lower carcass weight, smaller proportion of breast muscles, and lower fatness as compared to oat geese. The rearing system had an effect on the nutritional value of goose meat. Oat geese characterized by a higher proportion of protein, lower fat and cholesterol content, and a more favourable ratio of PUFA n-6 to PUFA n-3. In turn, breast and leg muscles of geese from intensive rearing were characterized by more favourable quality parameters (thermal losses, tenderness and the texture parameters). The ecological management of geese also had an effect on the majority of meat quality traits (colour, water holding capacity, shear force) body weight and carcass traits studied in W31 geese. Comparison to oat geese, organic ones had a lower body weight and a lower proportion of breast and leg muscle, and a higher proportion of skin with subcutaneous fat. It was concluded that the rearing conditions are one of the main factors affecting productivity and quality of goose meat.

Key Words: Goose, Rearing system, Performance, Meat Quality

09:45	16:45	15	Topic 7-2 Effect of Rearing System on Productivity and Quality of Goose Meat (TW)	Mr. Shih-Chieh Liao 廖士傑助理研究員
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## EFFECT OF REARING SYSTEM ON PRODUCTIVITY AND QUALITY OF GOOSE MEAT

Shih-Chieh Liao

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Goose industry is the third largest poultry industry after chickens and ducks in Taiwan. White Roman goose is the most popular breed and almost all the traditional goose farms adopt the free-range rearing systems. However, in 2015, the breakout of novel highly pathogenic avian influenza caused mass mortality and culling of geese in Taiwan. The goose industry was hardest hit by the pandemic and resulted in relative output value plummeted by 64.2%. To comprehensively improve the biosafety protection of geese farms, the demand of indoor rearing system has been increased gradually. Compared the literature of indoor and free-range rearing systems, there are difference regarding stock density, floor type, water bath facilities and illumination in management and led to different nutritional requirements for geese. Geese grazing in open air on pasture land have more opportunities for roughage intake, which reduce the fat content of carcass and enrich the functional substances of geese meat. Proper nutrition and environmental control in the indoor rearing system could advance the efficiency of goose meat production. In conclusion, feeding geese on suitable pasture land improves the quality of goose meat. Raising geese in the house with precise nutrition and environmental regulation enhances the yield and quality of goose meat.

Key Words: Meat-type Goose, Indoor Rearing, Free-range Rearing



Session 8 Industrial Issues				Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長
10:00	17:00	15	Topic 8-1 The Effect of Immunocastration on the Fattening, Slaughter and Meat Quality Parameters as an Alternative to Surgical Castration (PL)	Dr. Martyna Małopolska

## THE EFFECT OF IMMUNOCASTRATION ON THE FATTENING, SLAUGHTER AND MEAT QUALITY PARAMETERS AS AN ALTERNATIVE TO SURGICAL CASTRATION

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Routine castration to prevent boar taint increases public and consumer concerns for animal welfare. It is highly possible that piglets castration without anesthesia in European pig herds will be banned, so alternative strategies for controlling taint are needed. Boar taint is an odor or taste that can be evident during the cooking or eating pork, or pork product, and is perceived differently by consumers depending on individual sensitivity. One of these compounds is the hormone androstenone, which causes an unpleasant “urine-like” odour in pork. The aim of the ongoing research is to evaluate the method of immunocastration carried out in national conditions. The present study used Polish Landrace male pigs, divided into three groups: boars, barrows and immunocastrates. The fattening and slaughter performance as well as the quality of the meat will be assessed. The cortisol level in bristles of all animals will be examined. Morphometric analysis of the testicles, determination of the level of skatole, androstenone and volatile organic compounds, economic analysis and risk assessment of the presented method will also be carried out. The method will be complemented by analyzes in the field of molecular biology that will bring closer cellular processes in adipose tissue, muscle tissue, pituitary gland, selected fragment of the intestine and testicles. The development of low boar taint lines of pigs by application of genetic and genomics technologies would provide a long-term solution to the problem.

Key Words: Pigs, Immunocastration

10:15	17:15	15	Topic 8-2 Broiler Chicken Breast Muscle Myopathies - The Scale of the Problem, Causes and Prevention (PL)	Dr. Katarzyna Póltowicz
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## BROILER CHICKEN BREAST MUSCLE MYOPATHIES - THE SCALE OF THE PROBLEM, CAUSES AND PREVENTION

Katarzyna Póltowicz

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Intensive selection programs carried out to improve the production traits of broiler chickens, led to developed high growth-rate and breast-yield hybrids. As a consequence, these selection practices altered muscle architecture and metabolism led to occurrence of macroscopic defects in muscles from fast-growing broilers. The occurrence of meat defects concerns mainly the pectoral muscles and is related to their histological structure and the biochemistry and physiology of muscle fibers. White striping is a condition characterized by the occurrence of white striations parallel to muscle fibers on breast and thigh muscles of broilers. Woody breast imparts tougher consistency to raw breast fillets is characterized by a hardening of the breast muscle, which may have on its surface paler color, surface hemorrhaging and exudate. The condition of spaghetti meat characterized by a separation of the bundles of muscle fibers mainly in the cranial region of the breast muscle and this may, or may not, be associated with white striping. These three myopathies can appear together or individually, but it appears that they are all related. The occurrence and severity of the myopathies appear to be flock-dependent and are related to factors such as genetics, growth rate, nutrition, activity of the birds, and litter quality. Histologically, they have been characterized with myodegeneration, and necrosis, fibrosis, lipidosis, and regenerative changes. During meat processing, these myopathies represent quality issues because of firmer meat, lower water binding and visual defect, but do not present a food safety issue. The high incidence of these myopathies and the increasing concern by producers and consumers led to flood of questions on the causes and consequences of these abnormal chicken breasts. Nowadays, the poultry industry is focusing on ways to identify, reduce or eliminate the occurrence of these myopathies.

Key Words: Broiler Chicken, Breast Meat Quality, Myopathies

10:30	17:30	15	Topic 8-3 Achievements of Napiergrass Breeding in Taiwan (TW)	Ms. Tzu Rung Li 李姿蓉助理研究員
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## ACHIEVEMENTS OF NAPIERGRASS BREEDING IN TAIWAN

Tzu Rung Li and Shyh Rong Chang

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Eight distinctive varieties of Napiergrass (*Pennisetum purpureum*) were selected by the Livestock Research Institute. Napiergrass Taishiu No. 1 is leafy and palatable. Taishiu No. 2 with wide adaptability and high yield becomes the main Napiergrass cultivar in Taiwan. Taishiu No. 3 with a high leaf-to-stem ratio which has high relative feeding value for its high-quality fiber and high crude protein content (10%, dry matter basis). Taishiu No. 4 is for bioenergy can be fermented to produce alcohol and can also be made into straw-brick for fuel. Taishiu No. 5 has rich anthocyanins and polyphenols. It has high free radical scavenging ability to delay oxidation, and could for vital diets. The hay of Taishiu No. 6 is suitable for small companion animals. Taishiu No. 7 has good quality, high yield and lodging resistance. In 2018, the newest variety, Taishiu no. 8, was bred. It is both high quality and convenient for mechanical harvesting. The diverse Napiergrass bred in Taiwan, which could be used for animal husbandry, energy, food and pets. In the future, Napiergrass breeding will be directed towards stress-tolerance.

Key Words: Napiergrass, Breeding

Session 9 Industrial Partner				Chairperson: Dr. Sylwester Świątkiewicz Dr. Yih-Fwu Lin 林義福組長
10:45	17:45	15	Topic 9-1 Cattle Breeding in the Supervised Companies of National Support Center for Agriculture (PL)	Marcin Oszczapiński (KOWR)

## CATTLE BREEDING IN THE SUPERVISED COMPANIES OF NATIONAL SUPPORT CENTER FOR AGRICULTURE

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The National Support Centre for Agriculture (KOWR) was established in 2017 as an Agency subordinate to the Ministry of Agriculture and Rural Development. The main tasks of the KOWR include management of the agricultural real property (sale and lease), gratuitous transfer of land and non-returnable financial assistance, supervision over companies of particular importance to the national economy, issuance of decisions on permission for private trade in land, promotion of Polish agricultural and food products at home and abroad, preparation and dissemination of information related to the implementation of mechanisms of active rural policy in the markets of agricultural and food products. Brief, the KOWR supervises 41 national companies, including eight plant breeding farms, 19 animal breeding companies and 14 equine breeding centres (pure-bred and working horses). Moreover, the cattle farms are the technical background for the Polish breeding programs having more than 26000 cows, including reserves of native breeds. The National Support Centre for Agriculture supports new technologies in agriculture and ecological production, which is best proven by cooperation with scientific centres in Poland such as Universities and the National Institute of Animal Production. The KOWR is also present on agricultural and food fairs and missions. In 2021 it is planned to be noticed in Cologne, Dubai, Tokyo, Singapore, Shenzhen, Shanghai, Bangkok, Seoul, Mumbai and Taipei (Food Taipei).

Key Words: KOWR, Cattle, Horses, Livestock, Promotion

11:00	18:00	15	Topic 9-2 Enhance Bilateral Business Opportunities between Poland and Taiwan (TW)	Mitagri Co., Ltd. 臺農發公司
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## ENHANCE BILATERAL BUSINESS OPPORTUNITIES BETWEEN POLAND AND TAIWAN

### THE GLANCES OF MITAGRI CO., LTD.

Tracy Tarng

Executive Vice President, Mitagri Co., Ltd

Mitagri Co., Ltd. (the below content abbreviated as ‘Mitagri’) was established on December 5, 2016. It was established by the guidance of the Council of Agriculture. Recently, Dr. Hung Chung-Hsiu serves as the chairman and CEO of Mitagri to promote corporate governance and operation.

Mitagri is the abbreviation of Made in Taiwan (MIT) Agriculture (AGRI) in English. With the aim at leading Taiwan's agricultural products to the world through branding and marketing.

For overseas customers, Mitagri provides Taiwan comprehensive agricultural products, product selective services, new product innovation and marketing promotions, etc. Mitagri devotes itself to linking the farmers to access the international supply chain. Mitagri's best-seller products include fresh fruits, frozen products, processed products, etc. For Polish consumers, Mitagri recommends products including rice, frozen sweet potatoes, instant bubble tea, kumquat sweetmeat, etc.

To enhance the comprehension of the bilateral market and promote business opportunities through the Poland-Taiwan conference, we look forward to expanding the Poland-Taiwan exportation market for providers and customers to share the achievement of bilateral collaboration.

Key Words: Taiwan Agriculture Product, Export, International





# 2021 Taiwan and Poland Bilateral Animal Industry International Video Conference

2021年臺灣波蘭動物產業視訊國際研討會

2021/2/4 Thu — 2/5 Fri

TW (GMT+8) 15:00-19:00 | PL (GMT+1) 08:00-12:00



Livestock Research Institute (LRI),  
Council of Agriculture, Executive Yuan, Taiwan  
臺灣行政院農業委員會畜產試驗所

Organizer



National Research Institute of Animal Production  
(IZ PIB), Poland  
波蘭國家動物生產研究所