BOOK OF ABSTRACTS

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GENETIC ASPECTS OF DEER HERD QUALITY IMPROVEMENT

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The presentation deals with a variety of breeding strategies and techniques to improve genetic quality of deer herd including: i) Selective shooting of stags with poor potential; ii) Introduction of high quality sire stags in hunting parks or game estates; iii) Changing of sire stags and/or hinds in deer breeding farms; iv) Crossbreeding and pure bloodline breeding techniques; v) The use of artificial insemination and embryo transfer techniques in deer breeding farms; vi) Selective breeding based on paternity/maternity control by DNA analysis. Technologies are discussed from point of view of speed of genetic changes in deer herd. The presentation shows the advantages of modern breeding technologies for achieving a quick improvement of genetic quality of a deer herd as well as the necessity to maintain animal populations (herds in the case of farms) of pure bloodline for successful development of the industry.
MANGANESE SUPPLEMENTATION IMPROVES ANTLERS OF ADULT DEER EVEN UNDER A BALANCED DIET

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Mechanical properties, and in general, growth of antlers, has been thought to be mainly depending on Ca and P input. However, many other minerals can influence growth and mechanical performance in bones. Our research group examines mineral composition of antlers as a diagnostic tool to detect nutrition deficiencies, and also their effect in mechanical quality of the antler material, internal structure, density of cortical wall, and other antler characteristics. One of the most interesting minerals, although not the only one, seems to be manganese. In this presentation we remind early studies where a deficiency in manganese (and also phosphorus) detected in broken antlers naturally occurring in 2005, produced as a result a 30% reduction in antler weight, and a similar reduction in resistance to impact (impact energy), other mechanical properties, and thinner cortical wall. As a result of this experiment, we decided to examine the effects of manganese supplementation in spikers and adults of red deer under a balanced diet. Subjects were 29 deer of different classes of age (adult n=16, subadult n=3 , spiker n=10) that were divided into a control group (n=15) and a group subjected to injection (n=14). Antler mineral content (ashes, micro and macro minerals), mechanical properties (Work to peak force, Bending strength, Young's Modulus of elasticity) and structure (average cortical thickness, cortical bone's specific gravity, cortical bone ratio) were examined in to 4 different test points along the antler beam. Each variable has been related to
treatment, class of age, weight and year of growth of the antlers in a statistical test based on General Linear Model. The results show that manganese supplementation did not produce any effects in spiker antlers beyond an increase in manganese content. However, in adults results on the overall mean of the antler show a clear effect of manganese supplementation increasing the content of Ca, Na, P, B, Co, Cu, K, Mn, Ni, Se, Si, but no effect on mechanical properties. An analysis on the top portion of the antlers, where the effects are shown more clearly, showed the same effect in mineral composition, but also a 16% increase in work to fracture, much greater than in the mentioned study in wild deer. Thus, manganese supplementation can improve mineral composition of antlers, structure and some mechanical properties despite animals having a balance diet. The results are important for mineral and feed supplements in deer, but they may also have implications for human health and bone biology.
THE IMPORTANT PRINCIPLES OF MINERAL NUTRITION AND MINERAL FEED FOR DEER: THE SUCCESS STORY OF WS VERMEROVICE FEED COMPANY

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VVS Vermefovice s.r.o., Czech Republic

VVS Vermefovice s.r.o. is a family company located in the Eastern Bohemia, in Pardubice region: The mission of the company is 'to propose and implement solutions of effective animal nutrition and breeding'. VVS produces mineral feeds, concentrates and premixes for farm animals, game (deer) animals, horses and pets. Main competence and focus of WS is dairy cattle segment, which represents 80% of the company activities. The company has developed their principles of animal nutrition and experience in cattle, to game bovids and deer species. This talk will show some of those principles that may be of interest to deer breeders. The company pays a great attention to product and service quality as it has modern manufacture technology managed by integrated information system. This system enables full traceability of any compound applied. The production is GMP+ certified.

Among the authors, Ondrej Faltus has been working as Production and Quality Manager in WS Vermerovice (VVS) since 1997. He is specialised in feed technology and he is passionate hunter. He managed to join his hobby with his job some years ago when he started to build up Premin® brand for high quality minerals for different deer animals. He takes care of this growing market segment.

Jan Zahora is Commercial Director of VVS Vermefovice. His role in VVS is to select and purchase the best raw materials and ingredients for
production of high quality mineral feeds. Also, he takes care of new business development and foreign markets of VVS. Jan supports niche segments of VVS mineral nutrition including horses and deer. He is specialised in feed additives, ingredients and business management.

The success story of WS Vermefovice in deer feed program started in 2002 by cooperation of modern thinking hunters, university professors and WS, who produced a simple mineral feeds for deer. First five years, there was a practical experiment with mineral feed of WS conducted within breeding program for roe deer in Jeseniky mountains, the Czech republic. The results of the experiment was published in professional hunters' journal in Czechia and afterwards, VVS started to sell mineral feed for deer following a great interest of deer breeders. It continued step by step with developing a feed programme for deer based on scientific knowledge and customers' demand. VVS have organized many professional conferences to educate Czech deer breeders. Also, the company has already published 5 books about deer nutrition and management. It is involved and seeks to take a part in research projects of deer mineral nutrition.

Mineral nutrition should be the basic knowledge of any deer breeder. Mineral nutrition concerns macroelements as Calcium, Phosphorus, Sodium, Magnesium, Potassium as well as trace elements as Copper, Zinc, Manganese, Selenium, Cobalt and Iodine. Minerals are inorganic substances-chemicals prepared mostly from raw materials found in nature. They are essential compounds for living organism, responsible for tissue and antler growth, metabolism, muscle contraction, enzyme and hormone activity and hundreds of other function. While fewer studies have been done with deer, thousands of research tests were done on cattle and others livestock showing mineral
supplementation to be necessary for optimal growth and production. Mineral nutrient requirements differ according to the specie, sex, age, pregnancy, nursing, young animals, antler growing phase, weather season etc. Adding minerals trough mineral feed results in healthy animals, bigger bodies, bigger and heavier antlers, and greater cortical thickness. Very important is the fact, that minerals are transferred from mothers to fetus and after birth, via mother milk to young animals. Only well-bred young animals will give benefits for breeders in adulthood. WS Vermerovice is proud supplier of deer breeders in many countries, who achieved outstanding success in breeding. Deer breeders like to use knowledge and mineral feed from VVS for their professionalism and VVS like to use the experience of its customers to develop their products.
DEER NUTRITION: FROM EVOLUTION OF DIGESTIVE TRACK TO DEER FARMING PRACTICE

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Evolution has shaped adaptations and strategies of ruminants to maximise energy and nutrient intake under different climate and vegetation zones. The deer in particular covers all the distribution of ruminants having different range of plasticity to adapt on diet with seasonal changes of accessible energy and mineral contents. This can be limiting factor for their intensive husbandry, including farming, to enhance animal's body or antler mass. Therefore, to understand evolutionary and biological base of deer anatomy, physiology of nutrition can help us to optimise composition of diet and techniques for proper distribution (access to feed) during day and within different seasons to fully meet needs of deer individual. Talk will be focused on both the evolutionary base of deer nutrition and its adaptation to farming condition based on results of experiment evaluating frequency of red deer access to concentrates (higher energy and minerals intake) on antler quality.
PRINCIPLES FOR GENETIC SELECTION AND TROPHY PRODUCTION IN WHITE-TAILED DEER: FROM OVERVIEW OF THE SECTOR, TO BREEDING TOP QUALITY WHITE-TAILED STAGS AT GLENN DICE FARMS

Glenn Dice
Glenn Dice Farms, USA

Glenn Dice is the owner and operator of Glenn Dice Farms, peer recognized as one of the premier white-tailed breeding operations in North America. Located in south central Pennsylvania within 1.5 hours of Washington D.C. He began his dream of developing a globally recognized white-tailed breeding operation in January of 2001 and became instantly hooked. Glenn Dice specializes in the layering of specific genetic traits for a more predictable product. The antler traits he focuses on are long beams, wide spreads, and tall clean tines all embodied in a great look. Our live breeding and A.I. sires embody and pass on these traits and are some of the best and brightest in the industry. In this talk, Glenn Dice will share a brief history of the farmed white-tailed deer industry in the USA, discuss the economic dynamics of the white-tailed deer, he will show basic principles for genetic selection, breeding manipulation, deer nutrition, and herd management. The talk is particularly interesting for two reasons: there is an increasing interest in breeding white-tailed deer from some Russian Republics to Finland, and second, by comparing principles and techniques in white-tailed and red deer, it is possible to learn commons principles, or new aspects that may work also in red deer in addition to whitetail deer. He will also offer the audience the possibility to become breeders of high quality animals of this interesting species.
SENSORY ANALYSIS AND ITS ROLE IN PERSONALIZED NUTRITION.

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Sensory analysis is scientific discipline using human senses like instrument to analyze food properties. These human instruments decrease possibility to receive stimuli during ageing. Especially elder people are counted like persons with low availability of smell and flavor sensing. Utilization of daily intake is dependent on genetic variability and other factors like age, sex and racial/ethnic background. Taste preference and likeability of food is also connected with genetics and factors meant above. Nowadays there are lots of sensory studies based on genetic approach (bitter taste). Although these different experimental approaches can be used to improve our understanding of how nutrition affects various attributes such as health outcomes, sensory perception and taste preference. The current trends in personalized nutrition have focused on the role of genetic variation to understand why some individuals respond differently from others to the same nutrients consumed and taste preference. The knowledge of genetic variants in larger populations can clarify the importance of genetics in complex and the interactions that occur with environmental factors.

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INNOVATION IN RED DEER FARMING IN HUNGARY

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Intensive red deer farming has a 30 years history in Hungary; however the number of the farms is around 40 in the country. Most of the farms are small, with 10-15 breeding hinds and one or a few breeding stags. The main breeding goal for most of the farmers is the venison production, but breeding red deer for trophy (to achieve high point on the CIC scoring system) can be an option; however animals raised behind fences cannot be hunted or removed to open area in the country. These animals are sold in other European countries or outside of the EU. Since the tradition of the intensive deer farming has only been three decades, the quality of technology and the management is questionable on most farms. For many years a large number of red deer were exported from the Carpathian basin to New Zealand and there, their offspring reached a great level of quality on the venison, velvet and trophy market all over the world. These pure eastern bloodlines are disappearing now.

Since red deer in Hungary has such genetic potential, farms should focus on management. Since 2008 post mortem semen collection is done by the Deer Trophy Farm during the rut on the best areas of Hungary. After a red deer stag with great phenotype (good trophy quality) was shot in open area, the testis is collected and transported into the laboratory. After some examinations the semen is diluted and frozen in 0.25 ml straws. The quality of the semen highly depends on the elapsed time between the shot and the freezing. Motility ranges
between 30-80 % and the number of straws is around 60-140 per each stag. First fawns were born in 2010 from those collected semen. Deer Trophy Farm is the first company in Hungary which started an innovation to breed genetically superior animals for other farms. This innovation contains several methods from the nutrition thorough the molecular genetic examinations and breeding value estimations to the grazing management. Technology is based on New Zealand experience. The farm records all of field data in its own developed software. Breeding history and pedigrees, deworming dates and veterinary test results for Bovine Tuberculosis, IBR, Brucellosis, etc. is continuously recorded. The farm is the only Bovine Tuberculosis free (officially) farm in Hungary. Phenotypic data, like growth and antler parameters are used for genetic parameter and breeding value estimations for all individuals. Semen export from pure, healthy Eastern lines can be an option in the future.
HYBRIDIZATION PROGRAM IN DEER FARM RUDZIE - PRELIMINARY OBSERVATIONS

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One of the breeding programs conducted at the Deer Farm Rudzie since 2008 concerns hybridization and relies on crossing the English hinds with Polish stags, Polish hinds with Hungarian stags etc. We will present preliminary data of body and carcass weights of hybrids, observations on the inheritance of traits of antlers and breeding & feeding problems.
THE SIMPLE SECRETS OF SUCCESSFUL DEER MANAGEMENT AT WOBURN DEER FARM

Dan DeBaerdemaeker  
Manager of Woburn Deer Farm, UK

The world renowned Woburn Abbey Deer Farm was set up in 1993, with a long term vision of maximising the potential of the Woburn Red Deer genetics. We breed with only the very best Red Deer taken from Woburn Park and continue to produce some of the biggest antlered Red Deer in the world. Our Deer Farm is located alongside our 3,000 acre Deer Park.

Woburn Deer worked in partnership with The Stanfield Stud in New Zealand from 1994 to 2012 to establish a renowned herd of red deer in the southern hemisphere as well as in Europe. Woburn Oak has now taken the achievements of genetic bloodlines from Woburn Deer to new heights with the production of a world record weight of 23.7 kg of hard antler.

This talk will show how Woburn Deer Farm achieved to be a world leading deer farm in antler genetics and the deer management techniques used for it: from electronic tagging, artificial insemination, embryo transplants, the management of parasites and pasture management.
CHARACTERISTIC OF DEER MEAT (CERVUS ELAPHUS) OBTAINED IN LATVIA FARMS AND WILDLIFE

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In last years diversity of species grown under organic farming system has expanded and consumption and assortment of game meat products has significantly increased. Game meat, characterised by high nutritional value and specific organoleptic qualities. Following the drive of consumers for consumption of high quality meat and its products, raising of wild deer in captivity becomes more and more popular sub-sector in Latvia, firmly establishing itself among the traditional branches of animal farming like cattle breeding, pig farming and poultry farming. This technology allows for efficient use of grassland areas, for acquisition of high quality meat, ensuring availability of game meat on the market. It is one of the most prospective sub-sectors in Latvia, opening up extensive opportunities for export. Following this method, it is possible to plan the number of harvested animals, amount of the meat obtained and produce a pre-defined amount of raw material for processing. Investigations about biochemical composition of game meat are few. The investigations were carried out in different regions of Latvia. The chemical analyses of 45 samples were done wild and farm deer and beef obtained in organic production sistem in Latvia. In the studied samples protein and amino acids, fat and fatty acids were determined. Content of protein in samples of game meat was 19.61 - 23.6 %. The sum of essential amino acids in game meat samples were determined from 8.56 - 9.13 mg/100g"1. Concluded that the content of saturated fatty acids was
lower in the meat samples of wild deer 33.3 %, while in the meat samples of farm deer and beef it was higher 41.9 % and 42.2 % respectively. Because of the relatively high polyunsaturated fatty acid content and low saturated fatty acid content, wild game meat is more beneficial for human health. From results of our investigation concluded that the content of saturated fatty acids in meat samples of wild deer (33.3 %) was lower in comparison with meat samples of farm deer (41.9 %). From results of investigation we can see that ratio of polyunsaturated fatty acids n-6 / n-3 in deer meat samples were 2.5 - 3.6 and beef - 4.8. It is evaluated that nutrition value of wi$ game meat is higher than beef from organic fanning system.
THE FEDERATION OF EUROPEAN DEER FARMERS ASSOCIATIONS (FEDFA) REPRESENTS EUROPEAN DEER FARMING INDUSTRY

Radim Kotrba
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The renaissance of deer farming in Europe begun in early seventies last century. After pioneering years eight European countries, namely Belgium, Denmark, France, Germany, Ireland, Netherlands, Spain and United Kingdom (UK), has founded The Federation of European Deer Farmers Associations (FEDFA) in 1990 during meeting in London. FEDFA's objectives as declared in its Constitution are to 'safeguard the interests of the industry vis-a-vis the European Community', to 'promote the science and practice of agriculture by encouraging and improving the efficient breeding of deer, deer husbandry and product marketing', to 'coordinate research into the subject of deer breeding, farming and associated matters and to exchange and publish results', to 'establish and maintain a register of member associations and to compile the industries' statistics' and to 'safeguard industry interests vis-a-vis third countries' has not changed over two decades. Figures based on survey made in 2010 show that FEDFA represents roughly 10,000 deer farmers from 16 countries with stock reaching 300,000 animals. If we compare the recent number of farms and the number of member countries with the year 2000, they are rather equal. From that we may consider that the deer farming industry stagnates in Europe. To explain why the number of farms has not changed is hard and probably not possible to answer, because of great differences between countries in environmental, cultural, political, economical and other
conditions. It most cases basic explanation, based on examples from other niche agricultural sectors, can be oriented on lack of support or low market potential. Although, I can use as an example Germany, which has the highest number of deer farms (app. 5,600 farms). The farms in Germany are generally small having around 5 ha with stocking density from 3 to 7 deer per ha. It is clear that small farms can sell their production only locally and can not supply market on country level. The country where it is possible is UK, where they established Quality Assurance Scheme, which allow them to supply supermarkets with venison and venison production. Therefore, their production can more effectively compete with imported venison thorough better quality. It does not mean, that UK is not importing venison. Of course price matter.

According to figures, published in January 2014 at official magazine of Deer Industry New Zealand, 8 European countries are in top 10 importers of chilled venison from New Zealand in total volume of 11,658 tons (76 % of total New Zealand export) and value of roughly 93 million euro during 2013. This represents approximately venison from over 300,000 spikers! So the capacity of European deer farms can be doubled to meet increasing demand of European market. There is also good investment opportunity to establish larger operations to be able produce large amount of venison with higher productivity and affectivity. When I mentioned Germany as country with highest number of farms, it is on other side the biggest importer of venison from New Zealand (5,284 ton). The average export price of venison from New Zealand was 8 euro per kg. Why New Zealand is so successful? Historically it was explained that venison is secondary produce and velvet as first which allow them to export venison for
more competitive price. The opposite is true and venison formed 72.4% of total export value of deer products and velvet only 9.4% in 2013. It is hard to believe, that EU under new Common Agriculture Policy will subsidise higher those farmers, who would reduce they production through support of Ecological Focus Areas ('greening') and on the other side will not support European deer farming industry allowing imports of so large quantity of venison, which Europe can easily produce. Another potential for deer industry in Europe are export possibilities to Asia. Recently, there has been interest from importers from China for hard antlers and other products. To meet this demand there must be better networking between member associations to organise collection of large amount of requested products like hard antlers, tendons, tales, penises etc. Another possibilities are in Europe, because recently countries like Russia, Belorussia are requesting breeding stock to establish deer breeding industry for trophy and venison production. All of that needs more effective and professional approach which would be tremendous workload for a FEDFA as non-professional platform of a few people representing national associations. Therefore, the future task is how to be more effective and successful in representing deer farmer's interests at an EU level or international level? One solution could be to transform FEDFA from a platform of joint interests into a professional organisation with permanent staff or to establish or have a partner organisation, which will be more commercially oriented. Luckily, in 2013 the International Deer & Wild Ungulate Breeders Association (IDUBA) has been founded and I wish success and increase of potential for all deer breeding industry in Europe including deer farming. I believe, that FEDFA and IDUBA would find a strong partnership to be
mutually beneficial and wish to leaders of both organizations to have 'stag's power' to achieve it.
REPRODUCTION OF RED DEER IN FARM PRODUCTION

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One of the main objectives of our work was to collect available scientific and technical information concerning purpose and particularities of red deer farm breeding and reproduction, assisted reproduction, possibilities of long-term archiving of sperm using cryoconservation and verification of this knowledge in practice. Other intentions were the verification of practices for hormonal preparation of females in controlled reproduction and its relation to mating season - rut, and also the results evaluation of mating with selected sires on the intensity of the growth of progeny and production improvements monitored over 3-year period. From the presented results we found out, that the optimal dose of PMSG hormone to synchronize oestrus for farmed red deer is 200 R7. As we detect, 80% of the observed animals were positive pregnant, with the deposition of insemination doses to the uterus body. Small weight differences were found between progeny born from natural and artificial insemination. We described the methods and reasons for semen collection at breeding males wherein the positive results of the processes have been tested in praxis. Utilisation of proven breeding males with known and recorded information about their performance lead to improvements in breed values of their offspring, wherein semen collection and cryoconservation from quality proven breeding animals can save gene pool quality for the next artificial insemination and prevent inbreeding. This work was also financially of EU project, code ITMS: 26240220080.
ROLE OF PHYTOESTROGENS IN HUMAN AND ANIMAL NUTRITION

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Phytoestrogens are estrogens that occur in some plants. They are non-steroidal plant molecules whose structure differs from gonadal hormones, but with an estrogen-type activity. Foods containing phytoestrogens include beans, soy products, peas, lentils, and whole grains and seeds, especially flaxseed, rye and millet. A variety of these plant compounds and their mammalian metabolic products have been identified in various human body fluids and fall under two main categories: isoflavones and lignans. Foods with the highest relative phytoestrogen content were nuts and oilseeds, followed by soy products, cereals and breads. Health benefits attributed to a diet rich in phytoestrogens include relief from menopausal symptoms and lowered risk of osteoporosis, heart disease and breast cancer. Some studies have found that some concentrations of isoflavones may have effects on intestinal cells. At low doses, genistein acted as a weak estrogen and stimulated cell growth; at high doses, it inhibited proliferation and altered cell cycle dynamics. Some women use phytoestrogens as an alternative to hormone replacement therapy. Phytoestrogens have some beneficial effect on bone mineral density, insulin resistance, and cholesterol levels among women undergoing menopause.

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FOOD LABELLING IN EU - COUNTRY OF ORIGIN FOR MEAT

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Today, when you go meat shopping in the EU, you can only know where fresh beef comes from. This is because Country of Origin Labelling (‘COOL’) is only compulsory for this type of meat, which must display the animal’s country of birth, rearing and slaughter. As of April 2015, fresh pig, poultry, sheep and goat meat will also have to indicate the animal’s country of rearing and slaughter. Unfortunately birthplace labelling was scrapped for those types of meat. And when it comes to processed foods, you don’t have the slightest clue of the animal’s whereabouts. Only a handful of manufacturers voluntarily display this information. Consumers’ confidence in their food is at low levels and displaying origin information can boost transparency and help reverse the tide.

The US have mandatory country of origin labelling for all types of fresh meat, including the country of birth, rearing and slaughter. By contrast, in the EU, for fresh meat from pig, poultry, sheep and goat, only the country of rearing and slaughter will have to be labelled.

Should the EU move to adopt compulsory COOL for processed meat, we could expect some resistance from industry on both sides of the Atlantic. But at the same time, consumers in the EU and the US share similar expectations for a more transparent food chain. Therefore the potential impact of TTIP (Transatlantic Trade and Investment Partnership) on any contemplated new EU origin labelling rules for processed meat will essentially depend on whose interests are being put first: those of businesses, or those of consumers?
TUBERCULOSIS IN EUROPEAN DEER

John Fletcher  
The Venison Advisory Service, Edinburgh, Scotland; Reediehill Farm, Scotland

In every country that has enclosed deer, bovine tuberculosis has been a problem. This disease is communicable to humans and is therefore subject to official controls. Tuberculosis (TB) is a word used to describe several diseases caused by Mycobacteria:  
i) Mycobacterium tuberculosis is the commonest form of TB in humans but only rarely affects deer;  
ii) Mycobacterium avium causes avian tuberculosis which can kill deer but only affects humans who are immunologically compromised;  
iii) Mycobacterium paratuberculosis causes Johne's disease which is a major cause of death and economic loss in farmed deer but is probably not infectious to humans;  
iv) Mycobacterium bovis is the commonest cause of TB in deer and infects humans and cattle. This presentation is about M. bovis. M. bovis can remain undiagnosed in apparently healthy deer for years. Conventional skin tests are not very effective in deer. When deer are stressed, as when introduced into a new herd, then the disease can spread quickly. At autopsy some such herds may have visible lesions in over 30% of animals. This talk suggests what tests may be suitable and advises all those with enclosed deer to consider precautions to prevent the introduction of infected deer. New Zealand has been very successful in reducing the infection of its farmed deer: Twenty years ago in New Zealand three hundred farmed deer herds were known to be infected with M. bovis. Testing of deer using the single comparative skin test and bovine tuberculin was used together with blood tests (first a lymphocyte transformation test and now an ELISA). In 2014 only three herds remain infected. The testing protocols of NZ are the ones being
investigated in the UK where bovine tuberculosis affects very few deer. Using the same protocols in all Europe may be a breakthrough achievement in European deer farming.
MOLECULAR GENETICS AND GENE BANK DATA IN FOOD TRACEABILITY

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Consumers’ interest in the authenticity of the foods they purchase is increasing, especially where it concerns more expensive ‘value-added’ products such as organic foods, fair trade products or products with a protected designation of origin (PDO). ‘Value-added’ is a term used to characterise food products that have incremental value in the marketplace by differentiating them from similar products based on product attributes such as geographical location, environmental stewardship, sensory quality, artisanal production or functionality. The increase in the global movement of animal-derived foods has led to a corresponding increase in problems faced by regulatory agencies as they strive to guarantee the safety and wholesomeness of imported foods. The issues that regulators face from the global movement of human foods range from product authenticity and identity to food safety, which entails ensuring that products are as claimed and are free of harmful microbial and chemical contaminants. One of the most difficult aspects of quality assurance schemes is their reliability. To guarantee meat traceability a control and verification system through the whole chain has to be established. Different procedures can be applied to assure the origin of animals, carcasses and retail cuts such as: double ear tag identification, animal passport, slaughter identification, certification labelling. However, the verification of fraud needs great efforts in control strategies and techniques for verifying “a posteriori” the origin of the meat. The use of DNA markers has been shown to be a useful tool for individual identification, and in
consequence DNA markers can be used for meat identification. In general, they have not evaluated the sampling procedure inside a control strategy and evaluated the implications of population structure on individual identification. The aim of provided paper is to analyse the value of DNA markers in meat traceability, focussing on beef certification of origin. In this issue is necessary to use modern statistical method based on data mining and supervised learning. Supervised pattern recognition techniques use the information about the class membership of the samples to a certain group (class or category) in order to classify new unknown samples in one of the known classes on the basis of its pattern of measurements. Large scale of supervised learning oriented method was used for meat product traceability and identification on individual level. Genetic structure of several populations of red deer has been analysed and used as an model for supervised learning of different statistical methods. A result of provided thesis shows the possibility to classify unknown samples according to genetic data. Genetic diversity written in genetic data is holding enough useful information to identify animals and animals product originated from farm and wild nature. Model is also useful for classification on many logical levels as country, brand, region and many others.

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GENETIC SELECTION AND BREEDING MANIPULATION IN NEW ZEALAND: A SUCCESS STORY OF PEEL FOREST ESTATE

Graham Carr
Peel Forest Estate, New Zealand

Graham Carr is the owner of Peel Forest Estate in the middle of the South Island of New Zealand. This estate is the largest private deer farming operation in New Zealand, and as a farm in its strict sense (excluding game estates of larger size in other countries), it is likely the largest in the world. It covers some 2,400 hectare and runs over 8,000 fully recorded deer. The majority are red deer but some wapiti are used in certain breeding programmes. Peel Forest Estate is also New Zealand's largest deer stud, marketing a variety of genetics to both domestic and international markets. In this talk I will show the characteristics of our game estate. Then I will show the genetic quality of our trophies. Subsequently, I will explain the techniques in which this improvement is based. A key factor is to use a variety of science-based breeding technologies to accelerate their speed of genetic improvement. Our expansive range of world class genetics covers the field of trophy genetics for both CIC and SCI scoring markets as well as fast growth rate genetics for the venison market.
BOOK OF ABSTRACTS

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