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Modern reproduction of livestock

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Tom I

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General information

Welcome reception

The welcome reception on Friday 26th of January will be in the Faculty of Biology and Animal Science building (8:00am)
Address: Chelmonskiego 38C, 51-630 Wroclaw

Conference venue

Wroclaw University of Environmental and Life Science, The Faculty of Biology and Animal Science, Chelmonskiego 38C, 51-630 Wroclaw

Conference rooms

Auditorium Zootechnicum (AZ), ground floor, E12
Auditorium Biologicum (AB), first floor, E12
Room nr 218, ground floor, E13

Coffee breaks and luch

Coffee will be served on the ground floor, E12; lunch will be served on the -1 floor, E12

Public transport

For information about public transport (bus, train) to get around Wroclaw, please visit
http://komunikacja.iwroclaw.pl/?lang=pl&language=en

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Business Taxi +48 507 110 400

City maps

http://geoportal.wroclaw.pl/www/en/index.shtml

24-hours pharmacies

Between 10 and 20 24-hour pharmacies operate in Wroclaw. Pharmacies on duty are located in each of the city's districts and work 24/7. Pharmacies on duty are also open on Sundays and public holidays. At night pharmacies usually conduct sales through a small window. If the door is closed, you need to call a pharmacist on duty with a buzzer. The locations of 24-hour pharmacies (district, housing estate, street) are provided on the list and map below.

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Ambulance - 999
Police - 997
Fire Brigade - 998
Municipal Guards - 986
Crisis Management Centre (on constant duty) - 71 770 22 22

Wroclaw Airport

Wroclaw Airport is located ca. 10 km away from the city centre. The terminal for passengers is located in ul Graniczna 190. By day bus services 106 departing every 20 minutes from/to the Main Railway Station and PKS Coach Station. By night bus services 206.

Interesting places to visit

https://visitwroclaw.eu/en/#page_emergency-services

If you need additional information or just want to talk ☺

Our conference guardian: Alicja Mizera +48 731 854 508

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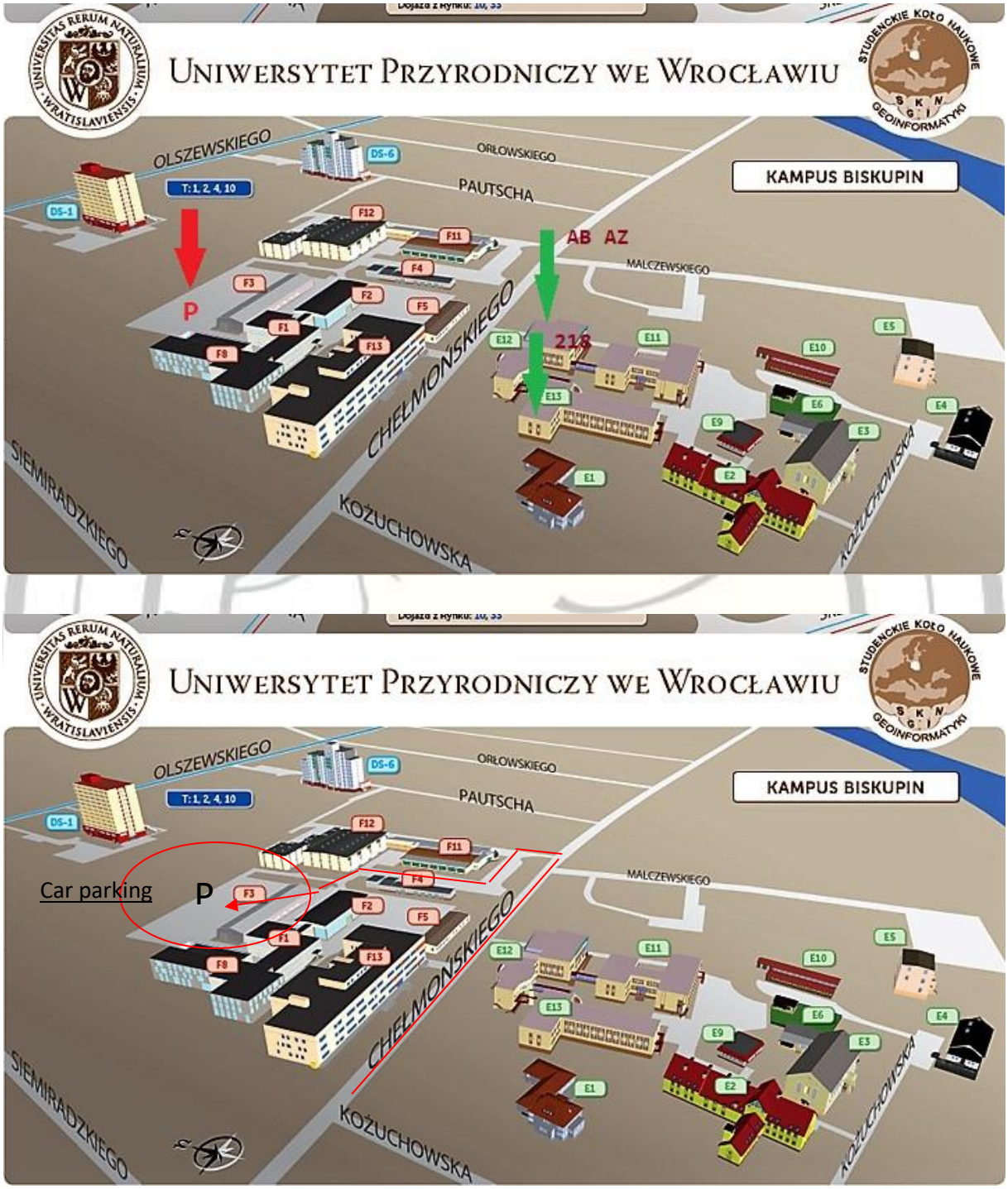
Map



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Conference Program

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Jarosław Jędraszczyk, MCB in Krasne

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Elżbieta Gandecka, PFHBiPM

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13:05 - 13:35
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Aleksandra Jagusiak

14:00 – 15:00 Lunch

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Discussion, thanks and end of the conference
Marian Kuczaj

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Moderators

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Marian Kuczaj

Anna Zielak - Steciwko

Jan Udała

Alicja Mizera

Barbara Król

Robert Kupczyński

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Audience AB

Wojciech Kruszyński

Rafał Bodarski

Room 218

Damian Knecht

Anna Rząsa

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I would like to cordially welcome all participants of the First International Conference *"Modern reproduction of livestock"* at the Wroclaw University of Environmental and Life Sciences. The organizers of the Conference are: the Department of Cattle Breeding and Milk Production, the Institute of Animal Breeding and the Faculty of Biology and Animal Science. The conference is held under the patronage of the Rector of the Wroclaw University of Environmental and Life Sciences.

Plenary lectures, thematic panels and poster sessions are planned during the conference. A scientific program combining contemporary approaches to reproductive biology of livestock with the awareness of current knowledge gaps and potential solutions has been developed. The organizers express the hope that the planned conference topic and its implementation will meet your expectations.

We have made every effort to create a common ground at the conference to exchange contemporary knowledge between academia and animal breeders in the field of applied reproduction biotechnologies for cattle, horses, sheep, pigs and poultry. The conference is addressed both to research workers, animal breeders, feed companies and veterinary surgeons, as well as to inseminators and employees of Animal Breeding Centers.

The organizers of the Conference together with the Moderators of individual panels have made efforts to orators were outstanding specialists, both from Poland and abroad. The lecturers from abroad are representatives of leading Universities from the Czech Republic, the Netherlands, Germany and Ukraine.

Thanks are due to all authors of papers, scientific short communications and abstracts for the effort of their preparation and timely sending. All scientific reports after the review have been accepted and published in English in a conference e-book that has an ISBN numer.

We also would like to thank all commercial sponsors who contributed to today's meeting. The involvement and participation of many institutions and companies that invest in such meetings are very much appreciated. We also thank the National Journal of Magazines, Hodowca Bydła, Hodowca Trzody Chlewnej, Hodowca Drobiu, and Indyk Polski who support the conference in the media.

We wish all participants of the Conference productive debates and establishing scientific cooperation, as well as a nice time spent in Wroclaw. See you next year at the same time!

Chairman of the organizing committee

Prof. dr hab. Marian Kuczaj

Plenary lectures

(abstracts)

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ABSTRACT

Nutrition as an element of high effectiveness of equine fertility maintenance

Rafał Bodarski, Kamil Sierżant, Barbara Król, Maja Słupczyńska

Department of Animal Nutrition and Feed Science, The Faculty of Biology and Animal Science, Wrocław University of Environmental and Life Sciences

In the paper, on the base of literature review, analysis an impact of various nutritional factors on mare and stallion fertility, pregnancy as well as in a measure on lactation were presented.

It has been discussed such nutritional aspects as recommended level of digestible energy and sources of the energy, requirement meeting on protein and essential amino acids, recommendations concerning the feeding ration formulation and also application of biologically active substances' additives positively affected horses fertility parameters (omega 3 fatty acids, antioxidants, B-carotene, plant extracts, vitamins, trace elements etc.).

Particular attention in the paper was paid to the role of proper mare and stallion condition during the reproduction period as well as the nutritional factors allowing achieving the best animals' condition during this period. It was also discussed particular, positive role (not only concerned with nutrition) of pasture in fertilising stallion living.

In this study most recent data of scientific examinations concern both, indirect as well as a direct positive effect of various dietary nutrients on horses reproductive performance results were used.

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ABSTRACT

Embryotransfer in horses - when, how, how much?

Jagusiak Aleksandra
Instytut Rozrodu i Embriotrasferu Koni (IREK), Mikolajewo, Poland

This presentation introduces the technique of embryotransfer in horses. In the last 15 years this method of producing foals found its way from experimental laboratories to commercial centres and has greatly increased in popularity with breeders. It is estimated that around 5 thousand embryotransfer procedures are performed every year in Europe on horses and dozens times more around the world. It is a viable way of acquiring foals from mares in training, very young mares and mares who, for any reason, cannot carry their pregnancy to term or give birth. More than one foal per year can be obtained from valuable broodmares, although in practice number greater than four is seldom achieved. The procedures of embryo collection as well as embryo transfer that are most widely performed use non-surgical, transcervical approach. The results of commercial embryo transfer programmes demonstrate that on average 3 attempts are needed for one successful pregnancy. This is an acceptable outcome if we recognize that on average 2 attempts of artificial insemination are necessary to achieve a pregnancy in a broodmare. The price of embryotransfer is influenced by the cost of recipient mares and their keep, the cost of equipment and the large amount of skilled veterinary work required. In many countries renowned for the quality of their horses, embryotransfer has a well established place as technique allowing production of valuable foals. In Poland, it is rapidly gaining in popularity and is correlated with the increasing number of high quality mares and better financial situation of the breeders.

ABSTRACT

Pharmacological induction of lactation in mares

Jagusiak Aleksandra
Instytut Rozrodu i Embriotrasferu Koni (IREK), Mikolajewo, Poland

Breeders are occasionally faced with a sad situation when a mare dies at foaling or shortly thereafter. They are left with a young foal that needs care, most importantly proper nutrition. This presentation gives some advice for this kind of situations. Hand rearing the foal is both time-consuming and expensive but most importantly it deprives the foal of the company of other horses and promotes development of dangerous, respect-lacking behaviour towards human. The method of pharmacological induction of lactation is explained in detail as well as the technique of facilitating adoption with the use of prostaglandin at a high dose. Pharmacological induction of lactation utilizes antagonists of dopamine receptors: sulpiride or domperidone. The therapy takes a few days before production of milk is initiated. It requires several further days of regular milking before the mare is ready to adopt. The adoption technique described in this presentation takes advantage of the fact that high doses of prostaglandins are able to trigger oxytocin release in the mare's brain, similarly as it takes place during parturition. The process of adoption is usually very quick and stress free. The author has used both methods with high success rate and, although as with any medical intervention they occasionally fail to produce the desired effect, they are worth popularizing.success rate, and although as with any medical intervention they occasionally fail to produce the desired effect, they are worth popularizing.

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ABSTRACT

The culling reasons and the possibilities to extending reproduction performance of boars from different genotypes

Damian Knecht

Department of Pig Breeding, Institute of Animal Breeding, Wroclaw University of Environmental and Life Sciences, Chelmonskiego 38c, 51-630 Wroclaw

The reasons for culling of boars demonstrate a close relations with the efficiency and economic profitability of operations in commercial herds and AI centers. Comparison of reproductive longevity with semen parameters is first step to effective management of boars' herd. Therefore, the aim of the study was to determine culling reasons and possibilities to extending reproduction performance of boars from different genotypes. The research material consisted of over 350 boars, whose performance was analysed from birth until death. Included during study: the culling reasons, survival probability, reproduction longevity and simulated possibilities to increase reproduction performance of boars. Too frequent exchange of boars and a large share of young boars negatively affects the cost of production and the health status. A large share of culling due to age, and low rate in the case of diseases, hormonal disorders and quality of sperm provide a good selection of material production and careful management. However, assessment of productivity and longevity should be connected separately for each genotype to get the most accurate information, while on genotype depended: semen parameters, culling reasons, length of maintenance in herd, overall efficiency. Appropriate culling schedule and herd replacement program connected with increasing reproduction performance time are current challenges, which should be followed when managing a herd of boars.

ABSTRACT

Development of a predictive model for reproductive performance of AI boars

M. Schulze[1], C. Ammon[2], R. Grossfeld[3], J. Schäfer[1], R. Bortfeldt[1], M. Jung[1], M. Aepli[4]

[1] *Institute for the Reproduction of Farm Animals, Schönow, Germany*

[2] *Leibniz Institute for Agricultural Engineering and Bioeconomy, Department of Engineering for Livestock Management, Potsdam, Germany*

[3] *Minitüb GmbH, Tiefenbach, Germany*

[4] *SUISAG, Sempach, Switzerland*

Barn climate fluctuations, especially temperatures above 25°C and high air humidity cause depressions of sperm output and quality that vary boar-specifically. In order to develop a prediction-model to forecast boar sperm output and quality on critical production dates due to climate changes, barn climate data (temperature (T), air humidity (H), air pressure (P), brightness (B) of 3 barns in one boar stud in southern Germany were recorded using data loggers (MSR145, MSR Electronics GmbH, Switzerland) for 12 months. Additionally, production and spermatological data of raw semen as well as sperm kinetics (SpermVision® Automorph, Minitüb GmbH, Germany) were documented. During the measurement period, 9.145 climate data records per barn, 11.590 ejaculate data records of 304 AI boars and 67.344 kinetic data records were collected. Data analysis was performed with the SAS 9.4 statistical software, using linear mixed models and Spearman correlations.

The production parameter weekday, ejaculation interval, breed and age of boar showed significant ($P < 0.0001$) impact on output and motility. The course of seasons translated into quarters and its effect on sperm output and the kinetic parameter velocity and distance average path (VAP, DAP) could be demonstrated clearly ($P = 0.0021$ and $P = 0.0122$). In detail, barn climate (T, H and T x H) and weekday influenced sperm kinetics VAP and DAP ($P < 0.0001$). An effect of P and B on sperm output and quality could not be shown. Morphologic defects correlated negatively ($r_s = -0.4$; $P < 0.0001$) with sperm motility.

Furthermore, data are used to estimate a predictive model based on an equation system where spermatological parameters of raw semen are the endogenous variables and climate data as well as boar specific data are the exogenous variables. The equation system is estimated by Two-Stage Least Squares regression analysis. Cross-validation is used to evaluate the performance and choose the model with the best fit. Finally, predictions are calculated based on the estimated parameters. In summary, we were able to verify the influence of barn climate, boar breed, age of boar and production proceeding on quantity and quality of ejaculates. Continuous acquisition of climate, production and spermatological data as well as sperm kinetics is the foundation of developing a prediction model, which can help to cope with times of sperm depression.

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ABSTRACT

The possibilities of the use of estrus synchronization and induction of the ovulation in the organization of cattle reproduction

Jan Udała, Tomasz Stankiewicz, Dariusz Gączarzewicz, Barbara Błaszczyk

Department of Animal Reproduction Biotechnology and Environmental Hygiene, Faculty of Biotechnology and Animal Breeding, West Pomeranian University of Technology in Szczecin, 29 Klemensa Janickiego Street, 71-270 Szczecin

The control of the time of oestrus and ovulation occurrence with the use of pharmacological agents may serve to achieve various goals aimed at improving the reproductive efficiency. These agents can be used to improve the organization of inseminations in large groups of animals, cycle synchronization in donors and recipients of embryo, induction of estrus in cows in which it was not observed and a reduction in expenditure related to its detection. They also provide the opportunity to treat some reproductive disorders, such as silent estrus and the ovarian cysts. However, it should be remembered that these agents can not be a remedy for organizational negligence or poor nutrition and keeping animals.

The main methods of estrus synchronization and estrous cycle regulation are based on: 1) shortening the *corpus luteum* function by inducing luteolysis (using prostaglandin): 2) extending *corpus luteum* function or replacing its function by using progesterone or synthetic analogs - progestins. Administration of prostaglandin F2α between 5-17 days of the cycle induces luteolysis, and the majority of females enter estrus and ovulate between the 2nd and 5th day after the administration of preparation. However, there is a large variability in this respect (1-7 days), conditioned by the stage of follicular wave at the time of prostaglandin administration. PGF2α protocols include a single or 2-fold injection of prostaglandin at intervals of 11-14 days. There are different systems of administration of PGF2α with insemination in estrus observed or performed in strictly defined time limits (most often 72-96 hours after administration of PGF2α). In some countries the Targeted Breeding system from Pharmacia - Upjohn was used, which consisted in systematic administration of PGF2α to cows starting from day 21 after calving at 14-day intervals and insemination based on oestrus symptoms.

The progesterone and progestogens have been widely used in the control of the oestrus cycle for over 40 years. Initially, they were administered mostly with food (eg MAP, CAP), and then spirals (vaginal inserts) were used, including PRID, CIDR and subcutaneous implants (Synchromate B). Released progesterone (or progestagens) acts as an "artificial *corpus luteum*", by negative feedback it affects the hypothalamic-pituitary axis, blocking cyclic activity. After removal of the inserts and unblocking the axis, gonadotropins (FSH and LH) are released and estrus appears. Various protocols of progesterone (progestogens) administration have been developed, also with PGF2 α, estradiol, PMSG (eCG) and GnRH.

Currently, programs for synchronization of oestrus and ovulation using PGF2 α and GnRH enjoy great popularity in dairy and meat cattle herds. The classic OVSYNCH program from the mid-1990s includes the administration of GnRH on day 0 and on day 7 $PGF_{2\alpha}$. After 2 days, a second dose of GnRH is administered, which synchronizes and shortens the time to ovulation. Insemination was recommended after 24 hours, and now is proposed between 8-16 hours. The fertilization rate was around 40%. Various modifications of the program have been introduced, including Cosynch (insemination with the second injection of GnRH), Selectsynch (observed during the insemination after administration of $PGF_{2\alpha}$), Heatsynch (instead of the second injection GnRH is given 17-β estradiol - banned in the EU), Ultrasynch (performed transrectal ultrasound and administration of $PGF_{2\alpha}$), Presynch (Ovsynch preceded by a 2-fold injection of prostaglandins at 14-day intervals), Doublesynch (alternating administration of PGF2 α and GnRH with insemination 10-16 hours after the second injection GnRH), Double-Ovsynch (twice use of the Ovsynch program with 7 days space between programs).

The effectiveness of these programs is similar to the original version of the Ovsynch system, and to a large extent is determined by various factors, including the effectiveness of estrus detection.

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ABSTRACT

Current problems in the routine production of bull semen in Poland

Alicja Mizera [1], Marian Kuczaj [1], Anna Szul [2], Jarosław Jędraszczyk [2]

Institute of Animal Breeding,Wrocław University of Environmental and Life Sciences, Chelmonskiego 38c, 51-630 Wrocław, Poland [1]
Malopolska Biotechnic Center Ltd©, Krasne 32, 36-007 Krasne, Poland [2]

Due to the increasing problems with the fertility of cows, and actually with the management of their fertility, the efforts of the semen collection centers are observed to make the product, which is the semen in terms of biological value a very good quality product. A product, that will support the effectiveness of breeding management in herds.

Such tendencies are observed in the assumptions of breeding programs. Thanks to the selection, i.e. selecting bulls that provide their daughters with traits related to their fertility (features most desirable by breeders).

Many semen collection centers are trying to offer breeders a product with improved efficacy, either by modifying the diluents used, which have a direct effect on sperm, or by influencing the donor - bull. Each of these solutions can be very attractive for semen collection centers.

Given the growing popularity of genomic selection, the younger bull will be in the center of attention. Direction of research should be assuring the breeder that the semen of such a bull has the same biological value as a bull in full somatic development.

It should be emphasized that each research area should have its field trial, i.e. confirmation of the effectiveness of A.I.

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ABSTRACT

Investigations on day of insemination and 305-days milk yield as well as economic value in German dairy farms

Anke Römer, Ariane Boldt, Jana Harms, Peter Sanftleben

State Research Centre of Agriculture and Fisheries Mecklenburg-Vorpommern (LFA), Wilhelm-Stahl-Allee 2, 18196 Dummerstorf, Germany,

Further investigations on calving interval reported a loss of economic income with increase of days open. Actual studies from the University of Aarhus (DK) e.g. showed an increase of total milk yield, milk efficiency and longevity by better reproduction performance in high yielding dairy cows by an extended lactation. Based thereupon the Institute of Lifestock Farming of the LFA made analysis on 189,867 lactations from 55,384 dairy cows (German Holstein) in 30 farms from 2009 to 2011. All cows had at least three lactations and are culled to evaluate calving intervals and longevity for each cow. Additional 7,662 milk samples were analysed on progesterone content to determine the interval from calving to commencement of luteal activity (CLA). The objective of this retrospective field study was to estimate the effects of different calving intervals on lactation persistency, 305-days milk yield, lifetime performance and longevity in high yielding Holstein cows. By dividing cows into groups of calving interval (CI) cows with the longest interval (> 460 days) showed the highest 305-days milk yield (9,557 kg ECM). Compared to the group of lowest calving interval (<= 370 days) it is an addition of more than 1,000 kg milk per cow (9,557 kg vs. 8,509 kg). Cows with a milk protein content at 1st milk recording of ≤ 3.5 % revealed first luteal activity 1.3±0.3 weeks later than cows that had a content of > 3.75 % protein ($P < 0.01$). Furthermore, cows with assisted calving or dystocia presented significantly later CLA than cows, which required no help during calving process ($P < 0.05$). Change in backfat thickness from 1st to 2nd milk recording had a significant influence on CLA ($P < 0.05$). Economic evaluations showed the highest profit with a CI of 431-460 days relating to a cows life (901 €) as well as per cow and year, respectively (499 €). Conclusions are that cows with more than 10,000 kg ECM per lactation need a longer CI for a better economy, more welfare, and less antibiotic dry off.

ABSTRACT

Factors influencing the fading of embryos

Vitaliy Nedosekov[1], Mykola Sytiuk[2], Iryna Furda[1]

[1]National University of Life and Environmental Sciences of Ukraine, Department of Epizootology and Veterinary Bussines Organization; [2]Institute of Veterinary Medicine The National Academy of Agrarian Sciences of Ukraine

In the process of reproduction of pigs an important role is played by a number of factors, in particular, production agents: feeding, breeding techniques, environment, related factors with pigs: hormonal status, metabolism, genetics, ovarian cysts, internal deviations, traumatism and infectious pathogens, which make up 45 %. These are infectious diseases: Porcine Circovirus (PCV), Porcine Reproductive and Respiratory Syndrome (PRRS), Porcine Parvovirus **(**PPV), African Swine Fever (ASF) and Classical Swine Fever (CSF).

Definition of reproductive disorders is infertility, foetus dissolution, abortion, at farrowing.

PCV-2 associated with certain diseases manifested in pigs. Virus control – correctly diagnosed, vaccine prophylaxis with recommended vaccines 2 times a year.

PRRS. Reproductive form of the disease in pregnant sows: late abortion, stillbirth, appearance of nonviable piglets. Prevention and control: the basis of the pathogen control is the constant vaccination of a positive stock, permanent support for proper sow keeping conditions, constant serologic control.

Virus PPV has no effect on the female only on the foetus, small litters associated with embryo loss before 35 days, mummified pigs of varying size, (30–160 mm), increased numbers of stillbirths. Control: compulsory vaccination of a repair livestock, planned vaccine prophylaxis of the main population 2 times a year, using an ultrasound.

CSF. Prevention and control: vaccination: live (in Ukraine) vaccines against CSF from strains LK-M and K, one-off from 3 months old, once a year, maintaining high standards of biosafety, protections of territories, control of the population of wild pigs and their constant laboratory control.

There are direct reasons for distributing infectious diseases: infected and sick on ASF domestic pigs, infected sick on ASF wild pigs: untimely detection and disposal; poaching shooting; migration; a campaign for total depopulation, contaminated by the virus ASF meat products and food waste.

There are indirect reasons for distributing infectious diseases: lack of systematic analysis of the causes of spread and disease control measures, absence of the program of struggle and eradication of the disease, low level of biosecurity and biosecurity in the farms, mistrust of the authorities and improper compensation of losses, lack of pig identification system, incompatibility of actions on prevention and struggle at the interstate level.

Biosecurity and biosafety in the farms have to include large turnover, replacements, lack of quarantine, sanitation, economic factors.

ABSTRACT

Early embryonic death in cattle

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During the preimplantation period of pregnancy, the most important decisions are related to its maintenance or termination in order to protect the mother from unnecessary energy expenditure in case of pathological course of pregnancy. In cattle pregnancy two main periods can be distinguished: the embryonic period lasting from the moment of fertilization to the 42nd day of pregnancy and the fetal period lasting until the birth of the calf.

In bovine species, the fertilization rate is high and on average is equal to 90%, but the average effectiveness of insemination does not exceed 55%. This difference indicates that embryo-fetal mortality is around 35%. However, 70-80% of all pregnancy losses occur in the first three weeks after insemination and especially between 7-16 days of pregnancy. This is the period of maternal recognition of pregnancy, which is supported by pleiotropic effects of progesterone. The embryo mortality rate after the period of pregnancy recognition decreases and the so-called late embryo mortality, i.e. up to 42 days of pregnancy, does not exceed 7% of all inseminated animals (Diskin et al. 2012). Among them, almost half (47.5%) is observed between 28 and 42 days pregnancy. The reasons for an early pregnancy loss in dairy cattle are complex and depend on: the biological quality of gametes and embryos, maternal metabolic balance, including the appropriate production of progesterone, the state of the uterine mucosa in the perimplantation period, immune tolerance of fetal antigens and fetal-maternal communication. The main goal of the presentation is to provide the latest achievements in understanding of embryo-maternal dialogue in critical periods of a preimplantation period of pregnancy and its influence on pregnancy maintenance in cattle.

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ABSTRACT

Factors affecting geese reproduction

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Despite fact that contrary to other poultry species, geese were among the first domesticated animals, their behaviour and reproductive traits are similar to those of wild ancestors. The latter however, causes several breeding problems and affect negatively the efficiency of production. Domesticated geese bred nowadays on the commercial scale are most likely derived from two wild species: true goose -greylag (*Anser anser*) with two subspecies: western (*A. a. anser*) and eastern (*A. a. rubrirostris*) and swan goose (*Anser cygnoides*). Both, wild ancestors and domesticated breeds, differ in range of the distribution, size, weight and body conformation, plumage colour, behaviour, physiology. However, the most important from breeding, and commercial production viewpoint, are differences in the reproductive traits, as well as in carcass quality, and flavour and in chemical composition of meat. Domesticated goose breeds are still characterized by relatively low fecundity, expressed depending on species and breed in: low number (18 – 60) of hatching eggs, low hatchability, rarely exceeding 80%, low male to female ratio (1: 3-5) and poor semen quality. Moreover, several other factors, such as unfavourable mating preference, nesting and brooding behaviour, length (5-6 months) and seasonality of the reproductive period may affect the goose production success. The most crucial aspects affecting goose reproductive success are: flock genotype and origin; quality of goslings (transportation, rearing program, feeding, biosecurity, immune prophylactics); preparation for the reproduction (environment, feeding, birds selection prior to setting); anatomy and physiology of goose male and female reproductive tract; sperm characteristics; management and environmental conditions during subsequent reproductive seasons; level of the reproductive parameters.

ABSTRACT

Signalisation of rooster quality based on crowing

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The aim of the study is to examine the relationship between acoustic variation of crowing and male quality of roosters in domestic chickens. Roosters represent an ideal animal model for testing the role of acoustic signals as indicators of male quality. Roosters establish linear dominance hierarchies based on their fighting ability. They produce loud, highly stereotyped vocalizations called as crows that is thought to be a means of advertising their territories. Previous studies showed that roosters crow significantly more often than subordinate males and dominant males produce crows of higher frequency than subordinates. We aimed to test whether various acoustic parameters are correlated with various measurements of male quality. We quantified a set of temporal and frequency parameters of crowing and measured their weigth and secondary sexual traits development: roosters' head ornaments – colour and size of the comb area, spur length from both legs including their symmetry, and semen quality (volume, spermatozoa morfology, motility, sperm concentration, Semen Quality Factor in 20 roosters of the Green-legged Partridge. Even though the function of rooster ornamnets and using of crowing for dominance status were studied independently, their mutual relationship were not studied yet.

ABSTRACT

Behavioural causes of pregnancy loss in horse mares

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Current horse breeding often challenges its biological origin that evolved through natural selection to optimize reproductive success. This process resulted in the biological potential of a mare to deliver a foal each year during her active reproductive period. Nevertheless, only 40 to 60 % of mated mares usually give birth, even under good stud condition and care (no predation pressure, optimal feeding and veterinary care, etc.). Behavioural aspects, including how a breeding mare perceives her environment, may also stay behind that discrepancy. Some of the common breeding practices more or less ignore behavioural needs and compromise welfare of the horses. Under natural conditions, female's choice of reproductive partner occurs and active behaviour plays a key role in the course of sexual encounter and timing of copulation. Compared to this, an unfamiliar stallion is often introduced to the mare in horse breeding and courtship is mostly restricted to copulation. In-hand mating is commonly managed in order to minimize spontaneous behaviour of the mare, either resistant or proceptive, and it often employs pain-inducing restraint devices such as nose or ear twitch, chain shanks on a halter or hobbles. This way induced stress might lower the probability of successful pregnancy and delivery. Mares mated out of home stables experience changes in physical and social environment including potential risk of male infanticide when a pregnant mare is exposed to a proximity of males that had not sire a foetus. Understanding that behavioural processes that evolved by natural selection still play a key role in current breeding practice may significantly improve both, horse welfare and reproductive outcome.

ABSTRACT

Cattle breeding and reproduction in the Czech Republic

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Livestock production in the Czech Republic provides more than half of the total agriculture income. The last 20 years of the development of the cattle breeding is characterized by increase of the milk yield per cow per year, stabile and very high share of dairy cows in milk recording (96 %), changes in the structure of cattle and dairy farms. Over the last 20 years the population of dairy cows decreased by 52,4 %, in the same time number of beef cows increase for 173 000 heads. Today, there are about 373,000 dairy cows in the Czech Republic. The aver- age herd size is 314 cows per farm. A number of large-scale farms operates more than one barn or even site with dairy cows. 70% of the Czech dairy cows are kept in barns with a capacity of 255 cows and above. The system of cattle breeding and reproduction is regulated by national breeding act nr 154/2000 Sb. From November 2018, the new Regulation (EU) 2016/1012 of the European Parliament will be in force for the area of breeding and reproduction.

All data from the performance and reproduction systems are collected and processed by one umbrella organization – Czech Moravian Breeder's Corporation, Ltd., as officially approved body.

Annually about 500 tsnd of the first insemination is carried out totally, of which 467 tsnd is done by semen of two main dairy breeds – Holstein and Simmental-Fleckvieh. In the beef herds 34 tsnd first insemination is carried out only, the rest of the herds/animals is using natural service.

In both main dairy breeds a trend of increasing of the milk production per cow and year is clearly showed. At the same time the length of calving interval decreased in both populations to 408 days in Holstein and 391 days in Simmental-Fleckvieh respectively.

ABSTRACT

Żelazna sheep reproductive performance depends on housing system

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The new trend in livestock production in Poland, as well as in other European countries, is to move from intensive to extensive management system attributed with the maintenance of animals in semi open sheds. Plasma progesterone, estradiol, and leptin are the hormones which play important role in reproduction. The ovulation level, the process of implantation, and then the survival of embryos and the litter size are affected by hormone endocrine. In this context, harsh environmental conditions may influence secretion of mention hormones and affects the reproductive performance of the flock. The animals were divided into two groups. The experimental group was kept under the overhead shelter and control group in the warm barn. The average litter size was similar in both groups. Each year the evaluation of ovulation rate and hormones concentration was made. The positive correlation between the number of *corpora lutea* of pregnancy and progesterone concentration ($P \leq 0.01$) and the negative correlation ($P \leq 0.01$) with number of *corpora lutea* of pregnancy, as well as between the litter size and estradiol concentration were observed. The correlation of ewe age with plasma leptin concentration ($P \leq 0.05$) and litter size ($P \leq 0.01$) was noted.

The lack of difference between the reproduction performance of ewes kept in the overhead shelter and the barn indicated a good adaptability of Żelazna sheep to harsh environmental conditions.

ABSTRACT

The influence of genetic selection of horses of the KWPN on their dressage and showjumping performance results

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The Royal Dutch Warmblood Studbook (KWPN) is one of the leading studbooks for riding horses in the world. The breeding program of the studbook is aimed at breeding horses that can perform at the highest level in competition of dressage or show-jumping. Breeding for competition traits is complex because the traits are lowly heritable and reliable phenotypes only become available late in life, which compromises the generation interval. As a consequence, genetic trends in competition traits would be low when only recordings from competition would be considered.

Recordings on young horses collected during inspections and performance tests are genetically related to the competition traits. Inclusion of young horse information into breeding programs has resulted in more accurate breeding values in particular for young stallions. As a result, genetic trends has increased. Relative recently the studbook has been through a step of specialisation in which horses are more and more bred for only one of the sport disciplines. An overview of the process of specialisation will be given and the genetic consequences will be evaluated.

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ABSTRACT

Disorders of fertility on the chromosomal background in horses

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Among the many factors that are particularly difficult to diagnose and affect horse reproductions are karyotype anomalies. Many authors report that they belong to one of the main noninfectious causes of disturbances in horse reproduction. They may be hereditary in the case of a mutation in the germline cells or arise *de novo*. So far studies indicate the occurrence of six structural aberrations and about seven numerical aberrations within autosomes. The most common and diagnosed is chromosome 63, X monosomy in the mare first described in 1975. It was detected practically in all representatives of breeds of horses bred in Poland. In individuals with this aberration, the symptoms of oestrus are not usually observed. The attempts to induce oestrus with pharmacological agents are also ineffective. Very often, monosomy occurs in the form of a mosaic, that is, outside the X0 cell line there are cells with a normal karyotype. Numerous studies indicate that the level of difficulty in reproduction is correlated with the percentage of cells with abnormal karyotype.

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Short Communication

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Influence of inter - creep length on milk yield of cows

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Biological progress in dairy farms and technical progress, mainly in the field of cattle nutrition and maintenance, resulted in a significant increase in milk yield of cows. The analysis of the interdependence between milk production and breeding of cows takes on special significance, because modern trends in the development of cattle breeding provide for systematic increase of productivity. It is believed that the length of lactation is to a decisive extent dependent on the length of the intercranial period (Sawa and Bogucki, 2009). The aim of the work was to compare the milk yield of cows depending on the length of the interpregnancy period, in particular lactations with different levels of productivity. The research was carried out in the West Pomeranian Voivodeship. The research material consisted of 120 Polish Holstein-Friesian black and white cows (phf HO), taking into account 305-day lactations. The cows were maintained by a pasture system. The animals received, apart from the fodder from the pasture, a feed dose twice a day from the PMR feed mixer. The longest interpregnancy period considered occurred in the herd cows with milk production does not exceed 7000 kg, and in those who remained at 7001-9000 kg and the third lactation was: average 194 and 196 days. The shortest ($P \leq 0.05$) interpregnancy period was observed in animals where the capacity on dandelion maintained at 7 001-9000 kg IV after lactation (160 days). The average length of the interpregnancy period on the farm was not satisfactory. The maximum length of the interpregnancy period should be 110-130 days. In the studies of Krzyżewski and others (2004) in cows producing more than 8,000 kg of milk the average length of the interpregnancy period is approximately 111 days, which does not coincide with our own research.

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The use of computer science for the presentation of zootechnical data

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Science is an ambiguous concept. It can be considered in several aspects. In terms of methodology, the content, functional and institutional aspects are distinguished. Regarding content, it is a system of duly substantiated assertions and hypotheses containing the possibly objective and adequate at the given stage of development of scientific cognition and socio-economic practice knowledge of phenomena, processes, structures, dependencies and regularities in a specific scientific field (1). In the process of educating students, it is important to provide knowledge about the evaluation and analysis of various types of scientific research, eg. analysis and evaluation of selected characteristics of farm animals, including various fertility indicators, assessment of births, etc. Computer graphics is an IT branch that allows you to generate images and visualize data. It can be done using raster graphics (bitmap) the image is presented by a set of points (pixels) with specified color parameters. In vector graphics, individual elements of the image are represented using mathematical expressions. Due to the type of the data, two-dimensional graphics can be used (2D graphics) where all objects are flat or 3D graphics (3D graphics) where objects are placed in three-dimensional space (3,4). The data can also be presented using various charts, the most well-known and used programs are included in the Microsoft Office package (2) such as an Excel spreadsheet or a program for creating a PowerPoint multimedia presentation. Computer graphics are currently a set of tools widely used in science, technology and culture.

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The sire breed effect on the piglets rearing results

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Introduction

AI has been more and more popular for raise production efficiency. Unfortunately, AI boars are nowadays tested based only on semen quantity and quality parameters. It is probably due to difficulties connected with latest reproduction evaluation, which is also partially determined by sows. However, from the practical point of view (pig producer position) more important are piglets rearing results.

The aim of the study was to determine sire breed effect of PL and PLW boars on the selected piglets rearing results.

Material and methods

The experimental material contained 10 PL and 10 PLW boars. The evaluation of litters were conducted for each boar and included: litter size, number of piglets total, live- and stillborn and body weight after birth. Evaluation of litters was conducted directly after complete parturition. Each live-born piglet was weighed using an electronic scale. The age, parity and breed structure of sows was similar across all groups. The numeric material was calculated using one-way ANOVA with *post-hoc* Tukey test.

Results

The litter size of total born piglets was 10.07 and 10.05 heads respectively for PL and PLW. Usually, the number of stillborn piglets grows proportionally with the increase of the number of piglets born in litter. However, in our study such relation was not confirmed because the number of stillborn piglets was for PL significantly lower despite the higher number of piglets born in litter. The consequence of higher stillborn piglets was probably the average piglet weight in litter because in deduction the weakest and smallest piglets died. Therefore, the heavier of about 0.16 kg were observed piglets of PLW boars than PL boars ($P \leq 0.01$).

Table 1. The effect of boar breed on litters characteristic

Item	Breed	
	PL	PLW
Piglets born in litter (head)	10.07±0.22	10.05±0.20
Piglets live-born in litter (head)	9.81±0.36	9.79±0.39
Piglets stillborn in litter (%)	2.38^{A}	3.08^{B}
Body weight after birth (kg)	1.34^{B}±0.15	1.50^{A}±0.11

^{A,B}- means with superscript between breed differ significantly at the level of $P \leq 0.01$

Conclusions

Summing up, although sire effect is rarely verified by specific piglets rearing results on the stage of AI stations, it is extremely important for breeder. During arrangement of the insemination plan, the sire breed effect should be taking into account for prediction the more specific litters parameters.

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The influence of breed and month of gilts birth on their performance breeding value

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The aim of the study was to analyse the influence of breed (Polish Large White - PLW and Polish Landrace - PL) and month of gilts birth on their performance.

There were estimated 257 gilts (respectively 124 and 133 PLW and PL). Results of breeding gilts performance test and their reproduction performance from one Polish pure breed farm were obtained from the National Research Institute of Animal Production in Kraków-Balice and were used in statistical assessment. Statistical analyses was perform on breeding value of chosen parameters. Treatment comparisons were made by ANOVA for a completely randomised design using the Statistica 10.0 statistical package. To determine the statistical differences there were used Tuckey's tests at level 0.01 and 0,05.

Comparing number of piglets on the 1st and 21st day of life only for gilts born in August, there were no high significant differences between the PLW and PL breeds ($P \leq 0.01$). The lowest average results: number of alive born piglets, number of piglets at the 21st day were demonstrated for the gilts born in December (0,58 and 0,27) for PLW and (-1,73 and -2,23) for PL. The highest values occurred in August for number of alive born piglets for PLW (1,88) and for PL (0,25) and for number of piglets at the 21st day in January for PLW (2,12) and for PL (-0,02).

Analysing the results of gilts performance test there were found statistical significant differences in daily gains for gilts born in March and April ($P \leq 0.01$) between the PLW and PL. The lowest average daily gains in PLW gilts population were recorded in November (-0,59) and for PL in August (-1,08). The highest results of this parameter in both breeds occurred in May (1,03) for Plw and (0,83) for Pl.

There were confirmed statistically differences in lean meat percentage for gilts born in July, September and November between the PLW and PL breeds ($P \leq 0.01$). The lowest results of this parameter for PLW was demonstrated in November (-1,24) and for PL in October (-0,64). While, the highest in both breeds occurred in May (1,03) for PLW and (0,83) for PL.

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The use of computer science in the aspect of animal life

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The interaction system of two components: computer hardware and software called the computer system is the foundation of computer science, utilized as a usable part providing remote data analysis and control. With the help of computer software, we can graphically represent the condition of devices for the installation of farm rooms. The AfiFarm system operating in the Windows software is one of the most popular systems used by producers of milking equipment. This system is a comprehensive farm database. The rural computerization process is an important factor in the development of modern farms. The use of modern information technologies on farms is now a driving force for its development. From year to year, the number of farms equipped with modern equipment increases, among which computers are already standardized (1). In a modern farm, decision-making processes are often supported by tools that take the form of computer programs. In the most complex form, these are decision support systems (SWD), defined as information systems used to collect, process and provide information to the end user in order to facilitate making the right decisions (2).

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The use of selected breeding biotechnologies in herds of cows with reduced breeding parameters

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The main issue in each inbreeding is the achievement of the best reproductive results, because they determine the economic viability of the conducted enterprise. In cattle breeding, the breeding progress has led to the achievement of high production potential, however high production, especially in dairy herds often insufficiently balanced in terms of nutrition, leads to lowering of health and reproduction indicators. The height of observed reproductive parameters is a determinant that precisely informs about irregularities and should be monitored and analyzed on an ongoing basis. Fertility decrease, prolonged calving interval, lower coefficient of insemination treatments, shortened heat period are often observed. The above, related to the earlier lack of cows due to metabolic disorders often leads to insufficient amount of replacement heifers. Due to the fact that the purchase of heiferss is an expensive step, it seems a good solution to use reproductive biotechnology in the form of buying sexed semen. The process of sexing the semen giving the breeder the ability to identify the sex before conception allowing for the regulation of the number of births of males and females, has been successfully used for some time in the world and should be practiced with us on a wider scale. Sexed semen can be found in the offer of most of the supplying companies, and despite the higher price and lower effectiveness of the treatment, it seems to be a solution worth considering.

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Season as a factor affecting conception rate and farrowing interval of crossbreed sows

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Introduction

Sows, although belong to the polyestrous animals, are characterized by seasonal variation. This may interfere with the continuity of the piglets production. The seasonality has negative effect on sows' reproduction performance, especially on conception rate and weaning-estrus period.

Therefore, the objective of the present study was to demonstrate the influence of the season on the conception rate and farrowing interval for crossbreed sows.

Material and methods

The research material consisted of 400 multiparous crossbreed sows (PLW×PL), divided on 4 seasons (Spring, Summer, Autumn, Winter) based on insemination time. The age and parity structure of sows were similar across all groups, and the same analogue boars were used. Analysis included conception rate and farrowing interval covers two-year period. The numeric material were calculated using one-way ANOVA with *post-hoc* Tukey test.

Results

The highest conception rate was noted for Spring (87.52%), then Autumn (86.25%; P≤0.05), and the lowest for Summer (84.32%; P≤0.01) and Winter season (83.91; P≤0.01). The farrowing interval is determined mainly by the weaning-estrus period. However in contrary to conception rate results, farrowing interval was the lowest for Autumn season (155.21 days), and respectively Summer (156.76 days), Spring (157.23 days), Winter (158.74 days). Statistically significant difference was even noted for the external values (P≤0.01).

Table 1. The results of conception rate and farrowing interval of crossbreed sows depending on season

Item	Winter	Spring	Summer	Autumn
Conception rate (%)	83.91^{C}	87.52^{Aa}	84.32^{C}	86.25^{b}
Farrowing interval (days)	158.74^{B}±7.21	157.23±6.12	156.76±5.43	155.21^{A}±8.12

^{a,b}- means with superscript between season differ significantly at the level of P≤0.05

^{A,B,C}- means with superscript between season differ significantly at the level of P≤0.01

Conclusions

Based on the above results it may be concluded that seasonal problem with conception rate concerned not only Summer but especially Winter season. Winter season was also characterized by the longest farrowing interval. The production potential of sows may be exploited only with taking into account season as factor influencing on the reproduction results of herd.

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The correlations between semen parameters, collection interval and age for purebreed Pietrain boars and its crossbreed variation

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Introduction

The breed structure of boars used in AI stations is strictly depended on the region demand on insemination portions. Pietrain boars and its crossbreeds with Duroc are still one of the most popular sire variants use for finishers production.

Based on the above consideration, the aim of the study was to determinate the correlations between semen parameters, collection intervals and age for purebreed Pietrain (P) boars and its crossbreed variation with Duroc (D).

Material and methods

The study included 4800 ejaculates obtained from P and D×P boars during their use in AI station. Intervals between next collections were determined in days and age of boars in months. The correlations were calculated using Pearson's method.

Results

The obtained results showed, that for semen volume and collection intervals higher correlation coefficient was noted for D×P, but both were weak (r=0.21 *vs* r=0.10 for P). The correlation of collection intervals and insemination doses were almost the same regardless of the genotype. It should be noted that number of insemination doses strictly determines efficiency of AI station. The correlation between semen volume and age of boars was higher for D×P than P boars. Surprised is over three times higher correlation for crossbreed. The correlation coefficients between age of boar and number of insemination doses were very weak regardless of the genotype.

Table 1. The Pearson's correlation coefficients between selected parameters of P and D×P boars

Item	Genotype	
	P	D×P
Semen volume/collection intervals	0.10	0.21
Number of insemination doses/collection intervals	0.22	0.23
Semen volume/age of boar	0.11	0.36
Number of insemination doses/age of boar	0.07	0.04

Conclusions

The study showed different correlations of selected semen parameters and study factors but only on weak and moderate level. Therefore, it should continue to seek the most dependent parameters for consideration in programs dedicated to AI stations.

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The results of live assessment of young PL boars from Poland

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Introduction

Polish Landrace (PL) is the most popular breed of boars in Poland used for artificial insemination. Therefore, it is extremely important to provide adequate number of young boars for AI stations and natural mating. Whereas the growth parameters during rearing period have strong impact on the quantity and quality of semen parameters.

The aim of the study was the analysis of the results of live assessment conducted on PL young boars from the whole country.

Material and methods

The study included 1345 PL boars assessed during 2015 year. The assessment was made between 170 and 210 days of life according to the methodology approved for Poland. There were collected: lean meat content, standardized daily gains, eye loin height, backfat thickness, and calculated: index of live assessment and BLUP. Obtained results were statistically evaluated using STATISTCA version 13.0.

Results

The calculated lean meat content for analyzed PL boars was 60.7%, what could be considered as normal level strictly held year to year. According to analyzed year, the standardized daily gains starting to slightly growth and achieved 664.6 g/day. It is the consequence of latest research suggesting that a little higher gains may determine better semen parameters results. The eye loin high and backfat thickness are two main components, which influence later performance of offspring. The index of live assessment was 112.3 with BLUP result 10.3. However, analyzing BLUP results it should be noted that PL is qualified as a maternal breed, therefore its BLUP evaluation is based on different strength of some parameters than for paternal breeds.

Table 1. The results of live assessment during rearing period of young PL boars

Item	PL boars
Lean meat content (%)	60.7
Standarized daily gains (g/day)	664.6
Eye loin height (mm)	58.0
Backfat thickness (mm)	10.4
Index of live assessment	112.3
BLUP	10.3

Conclusion

Only outstanding young boars better than predecessors may contribute to further improvement of pig production. Proper selection, breeding conditions and creating possibilities to show individual potential may assist in increasing the efficiency and economic viability of reproduction results.

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Comparison of functional values of expeled cows from the Polish Holstein-Friesian cows from loose housing sytem and tether barn

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The aim of the work was to compare the efficiency of milk use and longevity of phf HO cows used in two barns: loose housing (n = 206) and tie stall (n = 189) located in the Opolskie Voivodeship. Numerical material was developed using a one-way analysis of variance.

The average age of culling cows from breeding in loose housing and tether cowshed was 4.67 and 4.84, respectively, and their average length of milk use was 2.61 and 2.67 years, respectively.

The living capacity of cows kept in bulk was 24528 kg of milk and was significantly higher ($P \leq 0.01$) by 4678 kg of milk (23.6% of relative value) than in the tie barn. The protein viability (122.51 kg, 20.4% of relative value) and dry matter (536.0 kg, 25.1% of relative value) were also significantly higher ($P \leq 0.05$) than in the tie barn. Similarly, the fat content in milk of cows maintained in bulk was significantly ($P \leq 0.01$) higher by 0.27% (6.5% of the relative value) than in tethered cows.

Cows in loose housing produced 25.5 kg of milk per day, 1.76 kg of fat, 0.84 kg of protein and 2.52 kg of dry matter. They produced significant more ($P \leq 0.01$) milk (4.4 kg, 20.83 relative values), protein (0.13 kg, 18.3% of relative value) and dry matter (0.49 kg), 24.13% of relative value) than cows in a tether barn.

Cows maintained in loose housing system, calculated per day of life, produced significantly more ($P \leq 0.01$) milk (2.5 kg milk, 23.0% relative value), fat (0.06 kg, 13.3% relative value) and proteins (by 0.08 kg, 22.2% of relative value) and dry matter (by 0.28 kg, 25.45% of relative value) than cows in a tie barn.

It should be stated that the effectiveness of milk production and the longevity of cows used in the loose housing system were significantly better than their peers in the tether barn.

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Comparison of the values of reproductive traits of cows used in two different housing systems

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The aim of the work was to compare the values of reproductive traits of phf HO cows used in two barns: loose housing (n = 206) and tie stall (n = 189) located in the Opolskie Voivodeship. Average milk yield in 305-day lactation of cows kept in bulk was 10274 kg, while in the tie stall, 8189 kg. Numerical material was developed using a one-way analysis of variance.

The average age of the first calving of cows used in the loose housing system amounted to 754.35 days and was significantly shorter ($P \leq 0.01$) by 39.2 days (by 4.9% of relative value) than cows kept by tethers. The system of keeping animals also significantly ($P \leq 0.01$) differentiated the length of the first periods: intercalvong period (OMW) and intergestattion period (OMC). The average inter-lactation period of cows in the free-staging system amounted to 413.65 days and was shorter by 24.2 days (by 5.5% of the relative value) than in cows kept in tie stall. Intergestation period in cows in a free-stall cowshed was 75.4 days and was shorter by 22.91 days shorter (by 14.6% relative value) than its peers in tie stall.

More efficient detection of oestrus and easier getting cow pregnancy were observed in a loose housing. The number of inseminations needed to achieve pregnancy in cows in the I lactation was 2.21 and was significantly shorter ($P \leq 0.01$) by 0.43 (by 12.7% of relative value) than in cows in the stall cowshed. The cow's length drying period in the loose housing after the first lactation was 73.83 days and was significantly shorter ($P \leq 0.01$) by 19.82 days (by 11.2% of the relative value) than in the cows in the stall cowshed. The length of pregnancy in cows kept in both types of barns was identical and amounted to 278.0 days.

More favorable values of reproductive traits of cows used in loose housing result probably from better breeding organization and better cattle welfare conditions than in the tether.

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The structure of culling dairy cows due to the country of origin of bulls

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The aim of the study was to analyze the reasons for the culling of phf HO cows, including the country of origin of their fathers used in two stables: loose housing (n = 131) and tether (n = 122) located in the Opolskie Voivodeship.

The highest percentage of culling cows in the loose housing was represented by Dutch (22.14%), Polish (17.56%), German (14.5%) and English (14.5%) bulls, and a much smaller percentage represented bull's daughters (French (10.69%), American (10.69%), Italian (7.63%), Swedish (1.53%) and Czech (0.76%)). Reproductive problems were the most important reason for the elimination of cows coming from German (7.63%), French (3.80), Dutch (2.29%) and Polish (2.29%) bulls. Disorders of the limbs were the basis for the elimination of cows - daughters of American bulls (3.05%), Polish (3.05%) and Italian bulls (2.29%). Metabolic and digestive diseases were the reason for elimination of cows from English bulls (3.82%), Dutch (3.82%) and Polish (3.82%). Diseases of the mammary gland occurred in cows from the Dutch (3.82%), English (2.29%) and American (1.53%) bulls. Due to the low milk yield, a small percentage of cows after German (3.05%), Dutch (2.29%) and Polish (2.29%) cows were excluded.

In the tether the semen of bulls from Poland was most often used. As a result, most often cows were removed, being daughters of Polish bulls (81.97%), slightly smaller - daughters from Dutch bulls (15.57%) and American bulls (1.64%). Reproductive problems were the reason for the elimination of cows coming from Polish bulls (34.43%), Dutch (7.38%) and American (1.64%). Disorders of the limbs were the basis for the elimination of daughters of Polish (16.4%) and American (3.28%) bulls. Due to metabolic and digestive diseases, only Polish bulls (4.1%) were culling. Diseases of the mammary gland were the basis for the removal of cows coming from Polish (12.29%) and Dutch (4.1%) bulls. Due to low milk yield, cows from Polish bulls (3.28%) were excluded.

Summing up, it should be stated that when selecting bulls for breeding, following their country of origin does not ensure that daughters are only the best in terms of their length of use.

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Survivability of dairy cows for subsequent lactation and the reasons for their culling

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The aim of the study was to analyze the distribution of survival longevity of phf HO cows used in two barns: loose housing (n = 206) and tie stall (n = 189) located in the Opolskie Voivodeship.

It was demonstrated that the survival rate of cows for subsequent lactations: I, II, III, IV and ≥V in a loose housing was 85.9, 67.0, 54.4, 47.5 and 40.8%, respectively, and in the tether bar - respectively : 88.9, 66.7, 48.7, 37.0 and 30.7%. The survival rate of cows for I and II lactation was similar in both types of barns. The problem of earlier removal of cows from tether barns compared to free-standing barns was observed in further lactations. The differences in the survival rate of cows up to III, IV and ≥V lactation were 8.4, 18.9 and 10.1% respectively in favor of cows kept loose.

It was shown that cows kept in the tether system were most often culling from the herd due to sterility and reproductive system diseases (42.62% of all cows removed), motor system diseases (20.49%) and udder diseases (15.57%). In the structure of causes of cow removal, a smaller proportion were: random accidents (7.38%), metabolic and digestive diseases (4.10%), respiratory diseases (3.28%) and low milk yield (3.28%).

In the structure of the causes of cows culling in loose housing, a significant share was: barrenness and reproductive system diseases (25.19% of all cows removed), motor system diseases (16.03%), metabolic and digestive diseases (15.27%) and diseases udder (12.98%). A small percentage were: respiratory diseases (3.05%) and random accidents (2.29%).

Analyzing the structure of cow removal, it should be noted that cows kept loose in comparison to their tied peers were less frequently removed due to barrenness and reproductive system diseases (by 17.43%), motor system diseases (by 4.46%), and mammary gland diseases (by 2.59%) and for random reasons (by 5.08). In turn, cows kept in bulk in comparison to cows kept on tether were often removed due to low yield (by 5.12%), metabolic and nutritional diseases (by 11.17%).

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The structure of culling of dairy cows kept in different types of cowsheds, including the next lactation

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The aim of the study was to analyze of the reasons for the culling of phf HO cows, taking into account the age of cows, (ie the number of the next lactation) in two cowsheds: loose housing (n = 131) and tether (n = 122) located in the Opolskie Voivodeship.

In loose housing in the structure of the reasons for the culling of cows in the first lactation, a significant share was: barrenness and reproductive system diseases (9.16%), and a small percentage were metabolic and digestive diseases (1.53%) and sell for further breeding (1.53%). In the second lactation, the most important reason for elimination of cows from the herd were reproductive problems (9.92%) and metabolic and digestive system diseases (7.63%), as well as udder diseases (3.05%) and movement system diseases (3.05%). In the third lactation, cows were most frequently removed due to diseases of the movement system (6.11%), udder diseases (4.58%) and metabolic and digestive diseases (3.82%). In the fourth lactation cows were eliminated from the herd due to diseases of the movement system (3.82%), diseases of the mammary gland (3.05%), problems with reproduction (2.29%) and low milk yield (2.29%). In ≥ 5th lactation cows were eliminated from the herd due to movement system diseases (3.05%) and udder diseases (1.53%).

In the tether barn in the structure of reasons for the culling of cows in the first lactation dominated: barrenness and reproductive system diseases (17.21%), lactic gland disease (3.30%). In the second lactation, the reasons for the elimination of cows from the herd were: reproductive problems (12.29%), diseases of the movement system (6.56%), metabolic and digestive diseases (3.28%) and udder diseases (3.28%). In the third lactation, cows were eliminated due to: barrenness and reproductive system diseases (6.56%), udder diseases (5.74%) and movement system diseases (4.92%). In the fourth lactation cows were removed due to: barrenness and reproductive system diseases (4.1%) and movement system diseases (3.28%). In (≥) fifth lactation cows were eliminated from the herd due to diseases of the movement system (4.92%), reproductive problems (2.46%) and udder diseases (1.64%).

Regardless of the system of animal maintenance, the most intensive removal of cows follows the second and third calving. The desired prolongation of the period of use of dairy cows is favored by good fertility, health of limbs and mammary gland.

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Effect of addition of buserelin acetate to the extender on viability and DNA defragmentation of bovine spermatozoa after thawing

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Introduction

In initiating and maintaining male reproductive function hormones play a vital role. Particular interest is the utility of hormones as predictors of semen quality in epidemiologic studies. Gonadotropin Releasing Hormone (GnRH) has found extensive use in the treatment of prostatic carcinoma and precocious puberty as well as for female contraception. Moreover GnRH is a long time recognized as a potential target for the control and management of fertility in female animals. The purpose of this study was to determine the effect of addition of GnRH analogue (buserelin acetate) to the extender on the viability and DNA defragmentation of bovine spermatozoa after thawing.

Material and methods

The research material consisted of twenty Polish Holstein-Friesian bulls with an average age of 3.0 ± 0.5 years were housed individually in pens. From each bull, six ejaculates were collected using an artificial vagina. Semen samples were immediately transferred into graduated test tubes after collection, placed in a water bath at 37°C. After that semen samples were pooled to eliminate individual differences. Then, in four centrifuge tubes thoroughly placed 1 mL of fresh semen. Seminal plasma was removed by centrifugation at 700 rpm for 4 min. The remaining fraction was diluted with animal protein–free commercial BIOXcell® extender (IMV Technologies, L'aigle, France) to the final concentration of 120×10^6 spermatozoa/mL. To the four diluted samples were added successively 0µg/mL; 2µg/mL; 4µg/mL and 8µg/mL buserelin acetate (Buserelin® aniMedica, Poland). Sperm viability was determined by flow cytometer using a L-7011 LIVE / DEAD Viability Kit Sperm (Invitrogen, Molecular Probes, Barcelona, Spain). The chromatin instability was then quantified by flow cytometric used Sperm Chromatin Structure Assay (SCSA) test. Analysis of variance (ANOVA) was used to assess differences among stages of buserelin acetate supplementation on all the semen characteristics. Duncan's multiple range test was used to compare treatment means.

Results

The addition of buserelin acetate to extender did positively affect of viability and DNA defragmentation. Percentage of spermatozoa with undamaged DNA was higher ($P<0.01$) in the all observed samples with buserelin acetate compared to the control sample. A significant increase ($P<0.01$) in viability was observed in the sample with the addition of 2 µg/mL, increase by 6.61% compared to the control group.

Conclusion

We recommend adding 2 µg/mL to BIOXcell® extender to improve the quality of bovine semen.

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Effect of dilution of semen on sperm motility results obtained by means of the CASA system

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Introduction

Until now, standard microscopic technique, based on subjective visual assessment of sperm motility, has been widely used in the analysis of sperm motility. With the development of the technique, computer sperm motility analysis systems (CASA) were introduced to routine analysis. In order to obtain a good product that stands out from other available on the market, semen producers decide to introduce modern technologies to improve the work of semen assessment laboratories and improve methods of evaluation of ejaculates that end up in insemination straws. Which in turn allows the introduction of sperm with exactly verified quality on the market. The CASA system requires standardization and validation before use, and the image settings have been standardized for people and other species, in addition the type and depth of the chamber used, the number of fields analyzed, the analysis temperature and the sample preparation protocol influence the correct result. Therefore, the aim of this study was to investigate the effect of the degree of sperm dilution on sperm motility results obtained with the CASA system.

Material and methods

The study involved 20 Simmental bulls, healthy and kept individually. The ejaculates collected by means of artificial vagina were combined into one pooled sample to eliminate individual differences. Then divided into trials A, B and C and were diluted successively to a degree of 1:20 (sample A), 1:40(sample B) and 1:60 (trial C) with NaCl (0.09%) and evaluated selected parameters of motility using a CASA system. The obtained results were analyzed statistically. The analysis of variance (ANOVA) was used to evaluate the differences between the dilution degrees of sperm. Duncan's multiple range test was used to compared the results.

Results

The total and progressive spermatozoa movement analyzed applicating different degrees of dilution in all tested samples differed significantly ($P < 0.05$). The VCL and VSL parameters were significantly different ($P < 0.05$) in all the dilution stages tested (with increasing dilution the value of these parameters increased). In the case of the VAP and LIN parameters, there were no statistically significant differences between dilution in the 1:40 and 1:60 degrees. The results obtained at dilution 1:40 and 1:60 were significantly ($P < 0.05$) higher than those obtained with the 1:20 diluting. For the parameters tested (WOB, STR and ALH) no significant ($P < 0.05$) differences were found in the obtained results within the applied dilution stages.

Conclusion

To obtain more accurate, more reproducible results, it is recommended to use a 1:40 or 1:60 dilution.

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Influence of addition of *spirulina maxima* extract to the extender on viability, motility and DNA defragmentation of bovine spermatozoa

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Introduction

Spirulina maxima is a microalga rich in β-complex, vitamins, minerals, proteins, γ-linoleic acid and nutraceutical pigments. This blue–green alga belonging to the *Oscillatoraceae* family is a diet supplement that has health benefits in preventing or managing hypercholesterolemia, hyperglycerolemia, obesity, inflammation, cancer, and cardiovascular disease. It is also known from the antioxidant potential, action anti-diabetic effects on decreasing blood glucose level, regulating cholesterol, and improving insulin resistance. The effect of spirulina on reproductive functions is not well known. So far, studies conducted in rats have reported that *Spirulina Maxima* Extracts (SME) increased the body and testis weights, metabolic parameters, normal seminiferous tubules, Leydig cell number, testosterone levels and steroidogenic enzymes mRNA. The results of these studies are very promising. However, direct effects of Spirulina on sperm parameters have not been investigated. The objective of this study was to investigate the effects of SME on the viability, motility and DNA defragmentation in bull sperm.

Material and methods

Semen was collected from 12 bulls using an artificial vagina, transferred into graduated test tubes and placed in a water bath at 37°C. After that semen samples were pooled to eliminate individual differences. The samples were divided into five equal parts. SME was added at the concentrations of 0µg/mL; 2µg/mL; 4µg/mL; 6µg/mL and 8µg/mL to bovine Bioexcell® extender. The semen aliquots were cooled and preserved at 4°C. Their qualities were evaluated during pre-freezing, then the cooled semen samples were packaged into 0.25 ml straws. Straws were frozen in the vapor of liquid nitrogen, and stored at -196ºC in container. Straws were thawed one day later and the characteristics of spermatozoa were examined. Analysis of variance (ANOVA) was used to assess differences among stages of SME supplementation on all the semen characteristics. Duncan's multiple range test was used to compare treatment means.

Results

Results showed that the effect of SME on characteristics such as viability, DNA fragmentation and motility of spermatozoa were significant in pre and post freezing conditions ($P < 0.05$) and revealed that supplementation of SME extender improved the post-thaw spermatozoa quality in bulls. It significantly influenced the increase in the number of live spermatozoa in all tested concentrations of SME. The addition of 2 and 4µg/mL significantly ($P < 0.05$) influenced the improvement of the percentage of motile sperm before and after freezing. In all tested samples with the addition of SME, the percentage of spermatozoa with intact DNA was significantly ($P<0.05$) higher than in the control group after thawing.

Conclusion

We recommend adding 2 or 4 µg/mL of SME to BIOXcell® extender to improve the quality of bovine semen.

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Impact of addition of *vitamin B_{12}* to the extender on post-thaw motility, viability and DNA integrity in bull semen

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The physiological role and biological significance of vitamin B_{12} in cryopreservation of spermatozoa have not been sufficiently clarified. Hitherto, little has been published on the impact of vitamin B_{12} on the semen quality of bulls. In research on the effects of vitamin B_{12} on bovine sperm does not used modern semen quality evaluation techniques, but often conventional methods. Which in turn makes the results are still not accurate. Therefore, in the evaluation of the effects of vitamin B_{12} on frozen spermatozoa quality, the role of vitamin B_{12} during semen freezing-thawing is very important. Accordingly, the aim of this study was to evaluate effects of vitamin B_{12} supplementation in various concentrations in bovine sperm extender on the spermatozoa quality following the cooling and freeze/thawing process.

Semen was collected from 16 healthy and mature Simmental bulls using an artificial vagina. Vitamin B_{12} was added at the concentrations of 1.50, 2.50, 3.50, and 5.00 mg/mL to bovine Bioexcell® extender. The semen aliquots were cooled and preserved at 4°C and their qualities were evaluated during pre-freezing and then the cooled semen samples were packaged into 0.25 ml straws. Straws were frozen in the vapor of liquid nitrogen, and were then stored at -196ºC in container. Straws were thawed one, day later and the characteristics of spermatozoa were examined (viability, motility, DNA fragmentation). Analysis of variance (ANOVA) was used to assess differences among stages of vitamin B_{12} supplementation on all the semen characteristics.Duncan's multiple range test was used to compare treatment means.

Results of this study showed that the effect of vitamin B_{12} on characteristics such as DNA fragmentation, viability and motility of spermatozoa were significant in pre and post freezing conditions ($P < 0.05$) and revealed that supplementation of wit. B_{12} extender improved the post-thaw spermatozoa quality in bulls. The percentages of DNA-intact spermatozoa were significantly improved ($P < 0.05$) by supplementing with 1.50 mg/mL; 2.50 mg/mL and 3.50 mg/mL vitamin B_{12}. The sperm viability was significantly increased by the addition of 2.50 mg/mL. Compared to the control, the sperm motility and motion characteristics were improved in the presence 2.50 mg/mL of vitamin B_{12} in the extender.

In conclusion, for long term storage of semen of Simmental bulls, we recommend using 2.50 mg / ml of vitamin B_{12} in semen extender.

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Metabolic disturbances and their more important consequences for reproduction in high-yielding dairy cows

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In the scientific literature we can find a lot of evidence for important relationships and interactions between metabolism and reproductive performance in dairy cows. Proper nutrition, metabolism and metabolic internal homeostasis are basic for an appropriate level if welfare, health, milk productivity and reproduction in dairy cows. Metabolic disturbances observed often in high-yielding dairy cows have a significant, negative influence on their different vital processes, activity of reproductive system at and after parturition - during lactation, as well as parameters of reproduction and fertility. Deficiency of energy, minerals and vitamins in feeding especially in periparturient dairy cows but also in further lactation period can cause various metabolic disorders like: negative energy balance, hypoglycemia (with later effects: ketosis, fatty liver complex, left displaced abomasums - LDA), hypocalcemia, hypophosphatemia, hypomagnesemia, shortage of different trace elements and vitamins in tissues, which often are connected with abnormal metabolism and improper production of different hormones.

These metabolic disorders coursing with disturbed internal homeostasis can cause metabolic stress. This stress can activate the hypothalamic-pituitary-adrenocortical axis (HPA), which results in significant, several folds increase plasma corticosteroids especially cortisol. Cortisol is a powerful immune-suppressive agent, which causes depression of the leukocyte proliferation and their functions. Decreased phagocytosis of neutrophils, decreased cytotoxic ability of lymphocytes, as well as depressed activity of their cytokines, make it impossible for the normal, efficient maternal immune recognition and rejection of fetal membranes (as a foreign, allogeneic tissue expressed fetal antigens-MHC class I proteins by trophoblast cells) and finally results in higher risk to their retention and occurrence of metritis in cows. In these conditions in cows during metabolic stress and activation of HPA also synthesis of important hormones for reproduction like: prostaglandin, gonadotropin-releasing hormone (GnRH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), estrogens, progesterone, thyreotropin (TSH), growth hormone (GH).

The metabolic periparturient stress also activates production of catecholamines, especially adrenalin. Adrenalin activates adrenoreceptors of the myometrium and causes hypotony or atony of the uterus. Decreased uterine contractility and immune functions present around the time of calving cause significant increased risk of clinical cases like: dystocia, retained placenta, metritis, hypoinvolution of the uterus, endometritis, and other reproductive complications in cows. Thus mechanisms of retained placenta (RP) often have a metabolic etiology, usually in cattle herds, where important infectious diseases causing placentitis and abortions in cows are absent or prevented.

Especially dangerous for high productivity cows is hypocalcemia, which from the one side supports production of cortisol and adrenalin as a strong metabolic factor for HPA, but from the second side it causes deeper atony of uterus as a result of lack of calcium in muscle cells. Moreover, an acute shortage of calcium in the blood usually results in parturient paresis, a very critical metabolic health problem for cows because it increases deficiency of energy, minerals and other important compounds, when the animals do not take food.

Low concentration calcium inside smooth muscle cells causes hypotony or atony not only in uterus but also in digestive tract. Low peristalsis and stasis of digestive content inside the stomach and intestines in cows decreases feed intake and increases shortage of energy, minerals and vitamins. The metabolic and oxidative stress in relation to immune and reproductive functions in dairy cows may be caused also by shortage of different vitamins especially A, E and B complex, but also by a lack of micro or ultra elements like: selenium, zinc, copper, manganese, iodine, molybdenum, iron and chromium in diet. Thus metabolic and mineral conditions are very significant for health, productivity and reproduction in high-yielding dairy cows, both from the point of view of their health and economy of the herd.

Constant veterinary prevention against metabolic health problems in dairy cows, clinical and laboratory monitoring of the herd, analysis of nutrition, milk productivity, parameters of reproduction are the routine methods of management on dairy farms.

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Boar seminal plasma selenium and zinc concentration and their relation to semen quality

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Selenium and zinc play an important role in pig reproduction and are associated with boar semen quality and quantity frequently. Ejaculates from sixty-seven boars from two AI centres were used in this study. In addition to seminal plasma selenium and zinc concentration the following semen quality and quantity indicators were evaluated: morphologically abnormal spermatozoa, sperm progressive motility, semen volume, sperm concentration and total number of spermatozoa per ejaculate. The effects on these indicators were analysed by the mixed model procedure. Selenium concentration was associated with the AI centre ($P < 0.0001$) and with the sperm concentration ($P < 0.0001$). Selenium concentration increased from 15.02 ± 1.24 µg/l in a group with a sperm concentration up to 250×10^3 / mm^3 to 22.56 ± 1.63 µg/l in a group with sperm concentration over 350×10^3 / mm^3 ($P < 0.0001$). Zinc concentration was not associated with the tested factors. Selenium concentration positively correlated with zinc ($r = 0.53$; $P < 0.0001$), sperm progressive motility ($r = 0.29$; $P < 0.05$), sperm concentration ($r = 0.28$; $P < 0.05$), total number of spermatozoa per ejaculate ($r = 0.25$; $P < 0.05$) and negatively with distal protoplasmic droplet occurrence ($r = -0.35$; $P < 0.01$). Seminal plasma selenium and zinc concentration did not affect the evaluated semen quality. However, other factors affected semen quality and quantity were observed in this study. In addition, AI centre and sperm concentration affected selenium concentration. No factors affecting zinc concentration were found in this study.

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Using of fibrous feeds in nutrition of pregnant sows

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Recently has appeared a lot of results of experiments emphasizing possibility of additives application in sows' nutrition classified as bioactive substances. They are characterized among others by a quick increase its volume in gastrointestinal tract lumen of animals (ballast effect, fulfillment of gastrointestinal tract). New components used in feed mixtures can provide pregnant sows proper amount of good quality fiber and by that have favorably affect on health status and reproduction performance of animals.

The aim of the study was to assess the production results and health status of sows modulated by supplementation of FOS (as a crushed dried chicory *Cichorium intybus* L.) and MOS (as a yeast *Saccharomyces cerevisiae*) in the experimental dose. Pregnant sows during gestation were allocated into 4 groups. There was chosen pregnant sows after pregnancy test, according to analogue rules (age, the same proportion of primi- and multiparous at every group). Group I (control) received standard feed used at farm for the pregnant sows. Feed with additives of the MOS and/or FOS was used in experimental groups: Group II obtained a standard mixture for pregnant sows with the addition of 3% yeast; Group III – received the same feed with the addition of 3% dried chicory; Group IV the same feed with 3% yeast and 3% dried chicory. During the experimental time: body weight of sows (on service day, 112th pregnancy day) and they offspring (on the 2nd, 28th and 45th day of life) were recorded. The chemical composition, consistency and microbiological contamination of feces were estimated on 84th pregnancy day (feed exchange).

Sows received MOS (dried chicory as a good source of dietary fiber) and FOS in diets (group III and IV) indicated a better welfare during gestation period, they were calmer comparing to Group I. Additions of FOS and MOS (group III and IV) resulted in an increase of feed intake. Higher feed intake resulted in higher milk production and higher weaning body weight of their offspring. On the 45th day of life the average body weight of piglets in the control group was significantly lower when compared to Group IV. Obtained results regarding chemical composition of sows' feces, indicate better conversion of nutrients in comparison with control group. Supplementation the diet with FOS and MOS caused changes in intestinal microbial community. The populations of *Clostridium* and *Escherichia coli* in faeces samples was smaller in the FOS and MOS experimental groups.

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Morphometrical measurements as a method for early determination of reproduction potential of gilts

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The most important factor in animal production is reproduction. Creation and maintenance of stable heard is a key for effective productivity and producer profitability. In many commercial breeding herds (almost all over the world) a high percentage (~55%) of sows are culled at early parities (Stalder et al. 2005; Engblom et al. 2007; Young et al. 2008). The main removal reasons are a reproductive failure and leg problems (Lucia et al. 2000; Tummaruk et al. 2009). Proper selection of replacement gilts is based on many factors ranging from predicted reproductive ability to phenotypic production traits. The crucial role has development of reproductive tract. The occurrence of variation in genital development and large morphometrical differences between reproductive tracts in sows with the same genotype and from the same farm could be an essential factor for early prediction of reproductive efficiency. The research hypothesis was longevity and reproductive efficiency is greater with increasing length of reproductive tract. The main aim of this study was to assess the impact of vagina-cervix penetration length (VCL) on reproductive performance of sows.

The study was conducted on commercial herd located in the Małopolska region. The research material was 158 Polish Large White x Polish Landrace crossbred sows. After slaughter, the morphometric evaluation was made and lifetime data from each sow were analysed. Females were divided into 3 groups according to VCL measurement: group first 16.5-27.0 cm (n=13), second 2 27.5-37.0 cm (n=74) and third 37.5-49.0 cm (n=71). Differences among groups were analyzed using one-way ANOVA followed by Duncan test. Data are presented as mean ± standard deviation.

The results showed the wide range of VCL from 16.5 to 49 cm. Significant differences ($P<0.05$) among analysed groups were found according to parity. The number of parities were 4.28±3.21, 6.22±2.99, and 7.46±3.257in the first, second and third group respectively. The longevity of sows from group 1 was significantly shorter (445.85±370.82 days) compared to group 2 (709.58±440.28) and three (943.82±517.25). Similarly, the sows' lifetime production showed significant differences between group 1 (28.31±31.79) and both second (47.18±33.48) and third (63.66±40.24).

In conclusion, it should be emphasized that the properties of morphometrical measurements (in this case VCL) of the reproductive tracts are related to longevity and reproductive performance of sows. The sows with longer VCL were utilized in larger number of parities than other females, gave more piglets in their life, thus are more favourable for breeding herds.

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Effect of nanowater as an extender component on quality of boar semen*

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Artifical insemination in swine is still a challenge because of boars semen specify and requirements. Properties and composition of recommended extenders are very important because raw boars semen is fertile only few hours after collection. Scientist focus on extender composition to survive sperm vitality, motility and properties to obtain the success in AI.

The aim of the study was to assess the influence of nanowater on the biological characteristics of boar spermatozoa stored in liquid state at 15–17 °C through the 4 days.

Boar semen for the study was collected at 2 Polish Insemination Stations from 15 mature boars routinely used for semen production. Ejaculates were manually collected and subjected to standard evaluation procedures. There were prepared 3 types of extenders (M III® medium term extender) by dissolving commercially available boar semen extender in deionized water - DW (Group I - control) or nanowater - NW (Nantes Nanotechnology Systems Bolesławiec, Poland): NW-30 (Group II), NW-60 (Group III). Each ejaculate (n=15) was divided into 3 parts and encountered to 3 experimental groups. The biological properties of spermatozoa were evaluated on the 1st, 2nd and 5th day of storage. Sperm cell motility characteristic in extended semen was assessed by CASA system (Hamilton-Thorne sperm Analyzer IVOS ver 12.2l). Sperm cell motion parameters as MOT, PMOT, VAP, VSL, VCL, ALH, BCF, STR, LIN, RAPID, ELONG were analyzed. Sperm membrane integrity was assess on flow cytometer (Guava easyCyte™ Milipore) after staining of spermatozoa with dual fluorescent probes: SYBR-14 and propionian iodine (PI) (Life/Dead Sperm viability Kit, life Technologies, Ltd, Carlsbud, CA, USA).

Treatment comparisons were made by ANOVA for a completely randomised design using the Statistica 10.0 statistical package.

Slight differencies in adventage of NW was observed, more beneficial results obtained using NW-60 but it wasn't confirmed statistically. Further studies upon this interesting component are required.

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Relationship between culling rate and sows productivity

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The optimal parity structure of the sows herd guarantees the high reproduction results. The aim of the study was to determine the right culling predictor - age/adequate moment when reproduction performance of multifarious sows distinctly decreases.

The study was carried out in field conditions, at the farm working in one week production rhythm, on 5 successive technological groups (totally 500 Naima sows). Datas were recorded according to the GCP guidelines. There were collected: number of total born piglets (TPB), piglets born alive (PBA), piglets born dead (PBD), individual body weight of born piglets. Sows were divided into 4 groups: Group I - primiparous; Group II - 2nd and 3rd parity; Group III -4th and 5th parity; Group IV - 6th and next parity. Treatment comparison were made by ANOVA for a completly randomized design using the STATISTICA 10.0 statistical package.

The average litter size and piglets body weight respectively in groups I-IV were: 11,52 and 1,30; 12,59 and 1,51; 12,87 and 1,51; 11,64 and 1,56.

From the 6th parity the average reproduction performance of sows decreases what indicates their culling because of economical requirements. This decision must be taken individually basis on rule that multiparous sows stay at herd until their productivity is higher that primiparous ones.

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Seasonal changes of reproductive performance of sows weaned to individual stalls or group pens

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The right choice of housing conditions to physiological status of females is one of the most important factor enabling improvement of reproductive performance. Sensibility of sows to maintenance system is changing and in some periods they prefer to be alone (like perinatal period) but sometimes feel better in group. Generally group housing system is considered as better for pigs, because of possibility to move and realize natural behavioral needs. However, it can also stimulate negative phenomena, sometimes, like aggression and prolonged hierarchy fights. In many farms sows are housed individually during weaning to estrus period. Justification of such technology is poor condition of sows after lactation and thus increased risk of heavy injuries during fights, with consequences even of culling. In many other farms, however, group housing system in mating sector is preferred, with justification in better possibility of natural behavior of sows, and thus easier detection of estrus. The aim of the study was to determine the effect of season on reproductive performance of sows according to type of housing system (individual vs. group) in mating sector.

The study was conducted in large commercial facility located in the Małopolska region. The research material was 850 Polish Large White x Polish Landrace crossbred sows during two years of production. In total 3053 weaning sows were divided in to individual stalls (n=1579) or group pens (n=1474). The differences among groups and seasons in reproductive parameters were analyzed using two-way ANOVA followed by Duncan test. Data are presented as mean ± standard deviation.

Weaning to estrus interval was significantly shorter ($P<0.01$) in group pen sows compared to individual stall sows in Summer (5.9±4.3 vs. 7.8±8.3) and Fall (6.3±6.2 vs. 7.0±7.2) with tendency ($P<0.1$) to be prolonged in Spring (6.9±7.4 vs. 6.2±6.3) and Winter (6.3±6.7 vs. 5.5±5.8). Conception rate was significantly higher ($P<0.01$) in group pen sows compared to individual stall sows in Spring (87.0±6.4 vs. 83.3±9.6), Summer (85.5±4.0 vs. 81.8±5.9) and Winter (90.4±6.1 vs. 83.5±7.4) but significantly lower ($P<0.01$) in Fall (87.0±7.2 vs. 88.6±6.9). Litter size was significantly larger ($P<0.01$) in group pen sows compared to individual stall sows in Summer (11.9±2.8 vs. 11.1±2.6) and Fall (12.5±2.9 vs. 11.7±2.9) and ($P<0.05$) in Winter (12.4±3.1 vs. 12.0±2.8), with no difference in Spring (11.8±3.2 vs. 11.6±2.6).

In conclusion. The results showed general advantage of group housing system in conception rate and litter size, but with favourable influence of season for some parameters in individual stalls in Fall and Spring.

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Analysis of the impact of the age of the first calving of Polish Red-White cows on their milk traits and reproductive traits

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The aim of this study was analysis of the impact of the age of the first calving of 32 Polish Red-White (ZR) cows on their milk traits and reproductive traits in first lactation. Cows were kept in tether barn located in Lower Silesia. Due to the age of the first calving, the elements were divided into 3 groups (in months): I - up to 25 (n = 12), II - 25.1-28 (n = 12), III -> 28 (n = 8). The annual economic performance of cows in euros (EJR) was calculated (after Kuczaj 2008). The data were from the SYMLEK system. The results were analyzed by variance analysis using the SAS statistical package (SAS 'Local', XP_PRO). The Duncan test was used to assess the significance of differences between the values of the examined traits.

The age at the first calving of cows significantly affected ($P \leq 0.05$) the maximum daily milk yield, milk and protein yield in the first 305-day lactation and the economic efficiency index (EJR). The maximum daily performance of cows from group II (28.6 kg) was significantly higher than that of peers from groups I and III by 2.5 and 6.0 kg, respectively. The milk yield of cows from group II (6056 kg) was significantly higher than that of peers from groups I and III by 648 and 1061 kg, respectively. The protein yield in the 305-days lactation of cows from group II (207.2 kg) was significantly higher than that of peers from groups I and III by 10.0 and 38.0 kg, respectively. The annual economic performance of cows (EJR) from group II (1647.1 euro) was significantly higher than that of peers from groups I and III, respectively by 230.0 and 455.4 euro. There were no statistically confirmed differences in the basic indicators of breeding performance of cows between groups I, II and III. The average postnatal resting period in cows in groups I, II and III was 72.7, 67.0 and 80.9 days, respectively; the intergestation period was 162.1, 138.2 and 127.8 days, respectively, and the first intercalving period between 440.0, 430.7 and 407.1 days, respectively.

Summing up, it should be stated that the approval of breeding heifers of the Polish Red-White breed too early (Group I) or too late (Group III) has a negative effect ($P \leq 0.05$) on their milk and protein yield in the first 305-days of lactation and on annual economic result of cows. There was no significant effect ($P \leq 0.05$) of age and calving of cows on the values of basic fertility indicators.

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Influence of the age of the first calving of Polish - Red cows on their milk traits and reproductive traits

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The aim of this study was analysis of the impact of the age of the first calving of 27 Polish - Red (RP) cows on their milk traits and reproductive traits in first lactation Cows were kept in tether barn located in Lower Silesia. Due to the age of the first calving, the elements were divided into 3 groups (in months): I - up to 25 (n = 4), II - 25.1-28 (n = 9), III -> 28 (n = 14). The annual economic performance of cows in euros (EJR) was calculated (after Kuczaj 2008). The data were from the SYMLEK system. The results were analyzed by variance analysis using the SAS statistical package (SAS 'Local', XP_PRO). The Duncan test was used to assess the significance of differences between the values of the examined traits.

The age at the first calving of cows significantly affected ($P \leq 0.05$) the maximum daily milk yield, milk and protein yield in the first 305-days lactation and highly significantly ($P \leq 0.01$) on fat yield and economic efficiency index (EJR).

The most beneficial parameters of milk yield during the first 305-days lactation were obtained by cows from group III. Milk yield of these cows (3400 kg) was significantly higher than that of peers from groups I and II by 455 and 880 kg, respectively. The yield of fat (153.6 kg) and protein (121.6 kg) of cows from group III was significantly higher than that of peers from group II by 50.0 and 32.4 kg, respectively. The annual economic performance of cows (EJR) from group III (917.8 euro) was significantly higher than that of peers from groups I and II, respectively by 230.7 and 318.2 euro.

The age at the first calving did not significantly affect the values of most of the tested fertility characteristics of cows, with the exception of the postnatal resting period. The value of this trait in cows from group III was significantly longer (at $P \leq 0.05$) than cows from group I (by 19.7 days). The average intergestation period in cows in groups I, II and III was 191.2, 115.5 and 154.9 days, respectively, and the average intercalving period was 477.4, 394.7 and 411.7 days, respectively.

Summing up, it should be stated that in Polish-Red cows, which for the first time were calving over 28 months, significantly higher values of dairy traits in the first 305-days lactation were recorded in comparison with elements that started milking a bit earlier. However, more favorable cow breeding indices were recorded in cows that started milking at the age of 25.1-28.0 months.

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Effect of herbal additives in Greenleg Partridge hen diets on incidence of embryo abnormalities

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Under organic production it is recommended to use herbal additives, which can enhance body functions in birds. One such well-known plant immunomodulator is *Echinacea purpurea*. Therefore, the aim of the study was to compare the incidence of embryo pathologies in Greenleg Partridge hens raised according to organic farming principles and fed diets with herbal additives.

The experiment used 378 hens of the native Greenleg Partridge breed (Z-11). Each group was divided into 3 subgroups. Group 1 was the control, group 2 was supplemented with certified *Echinacea purpurea* at 10 g/kg feed, and group 3 received a herb mixture composed of common thyme (*Thymus vulgaris*) and *Echinacea purpurea* at 15 and 10 g/kg feed, respectively. Hens were kept on litter in a certified poultry farm according to organic farming recommendations. Stocking density was 6 birds/m^2 of floor space and hens were allowed to use outdoor areas (4 m^2/bird). Birds received certified feeds. In each experimental group, there was 1 rooster to 10 layers. During the study period, three experimental incubations were performed and fertilized unhatched eggs were examined to determine embryo abnormalities.

Analysis of the fertilized unhatched eggs showed that the most common abnormalities during the perihatching period in eggs from Greenleg Partridge hens were gout (80%), amniotic fluid residues (73%), and unabsorbed yolk sac (66%). The lowest frequency of embryo anomalies (around 133%) was observed in embryos from Z-11 hens fed herbal mixture; these included amniotic fluid residues, unabsorbed yolk sac, gout, and malpositions. Dietary supplementation with *Echinacea* increased the differences in embryo abnormalities during the perihatching period; their frequency was 185% and the most common anomalies were embryo malpositions and malformations. In group 1, in which no herbs were supplemented, the incidence of embryo abnormalities was 225%, and the most common anomalies were the remaining thick albumen and occipital edema.

In conclusion, the herbal additives fed to Greenleg Partridge hens kept under the organic farming conditions have reduced the incidence of abnormalities during the perihatching period. Supplementing the diet with a herbal mixture composed of *Echinacea purpurea* and common thyme was the most effective in reducing the incidence of embryo abnormalities.

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Effect of herb mixture on hatchability and quality of Rhode Island Red chicks under organic conditions

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The many restrictions on the use of preventive and curative pharmaceuticals in an organic farming system require poultry producers to use other authorized methods for improving the health of birds and embryos. Therefore, the objective of this study was to determine the effect of a herb mixture on the hatchability and quality of Rhode Island Red chicks raised in accordance with organic farming principles.

A total of 336 hens of the native Rhode Island Red breed (R11) were assigned to two experimental groups, each having 4 subgroups. Group 1 was the control group, group 2 was supplemented with a herb mixture composed of common thyme (*Thymus vulgaris*), black cumin seeds (*Nigella sativa*) and fenugreek seeds (*Trigonella foenum-graecum*). Hens were kept on litter in a certified poultry farm according to organic farming recommendations. Stocking density was 6 birds/m^2 of floor space and hens were allowed to use outdoor areas (4 m^2/bird). Birds received certified feeds. In each experimental group, there was 1 rooster to 10 layers. During the study period, experimental incubations were performed and the quality of hatched chicks was determined.

Fertility was 100% in the group of eggs from hens supplemented with herb mixture compared to around 94% in the control group. During the first candling, percentage of dead embryos was comparable in both groups (around 11%). The second candling showed around 3% of dead embryos in group 1 and around 2% in group 2. Hatchability from set eggs was higher in group 2 compared to group 1 (83 vs. 78%). However, hatchability of fertile eggs was comparable in both groups at 83%. The body weight of one-day-old chicks originating from R11 hens receiving supplemental herbs was around 3% higher compared to the chicks from group 1. Also the rate of yolk sac resorption was higher in the group of chicks derived from hens of group 2, and mortality of these chicks from 1 to 7 days of age was only 0.35%, whereas mortality of chicks from group 1 layers was 1.5% during the same period.

In conclusion, the herb mixture supplement for Rhode Island Red hens had a beneficial effect on egg fertility as well as the quality of hatched chicks, as reflected in the higher body weight on day 1 of rearing, lower mortality, and higher rate of yolk sac resorption.

Posters

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ABSTRACT

POSTER 1

Protocol Ovsynch – effectiveness in field conditions

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Objectives. Protocol Ovsynch is commonly used to treatment of anestrus cows and in nonpregnancy. The aim of the work was to analyze the effectiveness of the Ovsynch in field conditions, because the protocol is not always used correctly. The reason may be the administration of hormones by the support staff not on time. The results can be different. This report is a summary of the effectiveness of the Ovsynch program in the farm of realities, taking into account errors made during the procedure.

Materials and methods. Protocol Ovsynch consists of administering gonadoliberine on the day the program begins, injection of prostaglandins 7 days later, and then administration of GnRH 2 days after injection of $PGF_{2\alpha}$. Insemination is usually carried out 16-24 hours after the last hormone dose. In this study 399 cows were examined before hormonal intervention. To the analysis we used females with small ovaries without corpus luteum. During the procedure, the occurrence of heat and the day on which the insemination was performed, was recorded. Pregnancy was diagnosed 28 days after insemination by ultrasound examination. The results were subjected to statistical analysis in the program Statistica.

Results. Of the 399 females, 102 did not show heat. The fertilization index was 25% ($P<0.05$). The cause was insemination of females during the program (2-6. day) or injection of hormones at other intervals than recommended by the protocol.

Conclusions. Program Ovsynch is an effective tool for controlling cow reproduction only if protocol recommendations are strictly followed. The effects of the program are influenced by the administration of hormones consistent with the protocol - at the right time and at the right dose.

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ABSTRACT

POSTER 2

Sperm Quality and Some Biochemical Parameters of Bovine Seminal Plasma Treated by Copper Nanoparticles

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Copper is essential for spermatogenesis and thus this element is essential for male fertility. The presence of Cu2+ has been noted in semen and epididymal plasma, furthermore fluctuating levels of Cu2+ have been found in different parts of the epididymis. However, copper toxicity on sperm motility has been noted at a supra-physiological concentration of the metal ion. It is shown in some reports that high concentrations (approximately 0.2–1.5 mM) of copper inhibit mammalian sperm motility, while at lower concentrations it has no appreciable effect.

The goal of this study was to evaluate the influence of copper nanoparticles (CuNPs) supplementation at different doses on sperm motility parameters such as concentration, viability and motility, as well as some biochemical indices of cattle seminal plasma after storing semen up to 4 days at 4 degrees C.

The semen quality and biochemical findings were compared between non-treatment control and experimental groups treated with 0,1, 1 and 2 µl/ml CuNPs following 5, 18, 48 and 96 h interval. After this examination, semen samples were centrifuged (5000 g x 10 minutes) and seminal plasma was separated. Plasma total protein, aspartate aminotransferase (AST), lactate dehydrogenase (LDH) and alkaline phosphatase (AP) were determined. There were no negative effects in the percentage of motility, live spermatozoa and total morphological defects in experimental groups during 18 hours of storage at 4ºC. The semen quality in the first group treated with 0,1 µl CuNPs in all times of evaluation were significantly higher as compared with the control group ($P<0.001$; $P<0.05$; $P<0.01$; $P<0.01$). Whereas the spermatozoal survivability in other experimental groups was at the level of the control group. The activity of AST and LDH was significantly increased in the dynamics during the long-term storage in all groups, however, as compared with control values, the activity of these enzymes were lower in groups with 1 µl and 2 µl CuNPs. The alkaline phosphatase activity in the first group with lower CuNPs concentration was significant higher ($P<0.05$) during 18 hours of storage of the diluted semen at 4ºC, while in experimental groups treated with higher levels of CuNPs (1 µg and 2 µg) the enzyme activity was significantly lower, as compared with the control group at 18 and 96 hour ($P<0.001$).

Thus, the supplementation of the sperma diluent with copper nanoparticles in the concentration 0,1 and 1 µg/ml favors the increase of viability of sperm cells, as confirmed by the obtained biochemical parameters.

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ABSTRACT

POSTER 3

Selected reproduction rates as a measure of adaptation of the Polish Olkuska sheep to the new environment

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The local breeders from the Jura Krakow-Częstochowa region had a significant influence on the shape of the modern breed of high-prolificacy Olkuska sheep. The aim of the research was the analysis of adaptation to the new environment based on selected indicators of breeding ewes - prolificacy and breeding efficiency. The herd of the Polish Olkuska sheep on Experimental Station of the Wrocław University of Environmental and Life Sciences was brought in autumn 2011 from the area of the myszkow county (Żarki). Before bringing the flock, the prolificacy was 215%, and breeding efficiency was 165%. In 2016, the prolificacy rate amounted to 180.5%, breeding efficiency was 155.81% and they were respectively about 19% and 5% lower in comparison to indices from native areas. After a period of five years from the introduction, stabilization of the described reproductive indicators was observed.

ABSTRACT

POSTER 4

Reproductive behavior of ganders in a harem mating structure

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Natural mating is the most common method for reproduction in domestic birds. In contrast to hens the study of mating behavior of geese has not received much attention. In a harem mating it is possible to analyze the reproductive activity of individual males without social interactions affecting access to sexual partners. The aim of the study were to: (1) characterize domestic gander-goose reproductive behavior and (2) to determine interrelationship between mating activity (MA) parameters and fertility (F). Zatorska goose males and females were studied during intensive breeding period. A digital recorder (recording -6 h/ daylight (10 h), 3x/week) connected to cameras was used. Fertility (F) was evaluated after artificial incubation of eggs. The frequency of gander-goose interaction determined by courtship displays (Cou), copulation attempts (CopAt) and successful copulation (SCop) was 1.26 acts/ 6h with SCop on the level of 0.64 acts/ 6h. Based on the results of the number of copulations in the first half of the breeding period ganders were grouped into low (33.3 %), intermediate (40 %) and high copulation (26.7 %) frequency. For the high copulation frequency group SCop, total MA and effectiveness of mating were greater in first half of breeding period. The greatest F for high copulation frequency group compared with intermediate and low was noted but only in the first half of the breeding period. However, in the second half of the breeding period there was a decrease in F for this group. There was significant correlation between Cou (r_p = 0.55) and CopAt which were positively related to SCop (r_p = 0.47). The successful copulations were significantly related to F (r_p = 0.37). It is suggested that successful copulation be considered as a predictor of reproductive success in flocks of geese because of its positive correlation with fertility.

This research was financed by the Ministry of Science and Higher Education of the Republic of Poland (statutory activity, DS no. 3264).

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ABSTRACT

POSTER 5

Prediction of egg-laying rate and egg weight during the meat-type hens production period

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Meat-type hens are kept only for the production of hatching eggs. Egg production pattern of these hens is characterized by shorter egg sequences and greater number of out-of-lay oviposition rhythm compared to laying-type hens. The aim of the study was to find the most suitable mathematical function for describing the egg-laying rate and egg weight in meat-type hens. The daily recorded egg production and egg weight data from 100 hens were used. On the basis of the total number of eggs laid groups of hens with low, intermediate and high egg production (EP) were created. Three functions were compared: gamma, Narushin–Takma and logistic-curvilinear using the nonlinear regression procedure (PROC NLIN, SAS 9.4). Models were fitted to the data set including all hens and to the data divided into three EP groups. The mean laying rate within 44 weeks of hens production period was 71.3% with the average egg weight of 62.3 g. The mean total number of eggs per hen was 21. Three goodness-of-fit criteria were calculated: AIC, MSE, R^2. The AIC and MSE reached the lowest values when egg-laying rate was modeled by logistic-curvilinear function (AIC: 168, MSE: 38) and the highest when modeled by gamma function (AIC: 237, MSE: 180). R^2 were high for all functions (0.96). When the egg weight was modeled, the AIC varied from 21,049 (Narushin–Takma model) to 21,112 (gamma function). In the case of all models, R^2 was 0.99. The lowest MSE (156) was observed when the egg weight was modeled by Narushin–Takma function and the highest (158) by gamma function. All the functions have the same quality of curve fitting for egg weight. From a practical point of view for the easiest calculation, the both traits could be modeled in meat-type hens flock without the division into EP groups. Simple model, with smaller number of parameters, i.e. the logistic-curvilinear, was recommended to be applied because of their ease of calculation.

This research was financed by the Ministry of Science and Higher Education of the Republic of Poland (statutory activity, DS no. 3258 and 3264).

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ABSTRACT

POSTER 6

The influence of pregnancy on selected wool parameters of Polish Olkuska sheep

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The aim of the study was to determine the effect of pregnancy on wool yield and quality parameters of Polish Olkuska sheep. The research was performed on 27 of ewes race Olkuska sheep maintained at the Agricultural Experiment "Swojec" belonging to the Wroclaw University of Environmental and Life Sciences. The animals were divided into 3 groups (9 animals each): 1 (control) - ewes without lambs, 2 - mothers with one lamb, 3 - mothers with twins. Wool samples for the tests were taken before the blades from the area of the left scapula. As part of the measurements and determinations carried out, wool productivity, natural wool lenght, the actual length, thickness, strength and heat protection of wool were determined. Based on the obtained results, it was found that the pregnancy affected the bleeding, thickness and breaking strength of the fibers, whereas it had no effect on wool yield, real length, breaking stress and heat protection.

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ABSTRACT

POSTER 7

Effect of single and twin pregnancy on the wool thickness from Polish Olkuska sheep during the year

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The aim of the study was to determine the effect of pregnancy (single and twin) on the wool thickness from Polish Olkuska sheep wool. In addition, the changes in thickness in subsequent months of regrowth were analyzed. The research was carried out on 27 ewes of the Olkuska breed, kept in the Agricultural Experimental Station "Swojec", belonging to the Wroclaw University of Environmental and Life Sciences. The animals were divided into 3 groups (9 animals each): 1 (control) - ewes without lambs, 2 - mothers with one lamb, 3 - mothers with twins. The wool samples for the tests were taken before the blades from the area of the left scapula. Twenty hairs were collected from each ewe that were divided into 12 equal sections corresponding to particular months of wool growth. The mean values obtained from 20 measurements for individual ewes and fiber sections were treated as the average fiber thickness for a specific sucking month. The largest thickness was characteristic for the hair of group III (twins) - 28.63 µm, next from group II (one lamb) - 27.44 µm and the smallest from the control group - 26.71 µm. As a result of the measurements, it was found that the thickness of the hair changed during the year (in the following months of regrowth).

ABSTRACT

POSTER 8

Treatment of infection diseases of cow reproductive system by nano preparation

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Infection diseases, especial emdometrits plays major role in cows infertility. Traditional schemes of reproductive therapy based on using antibiotics, as antibactirial agents that are discursive point between veterinary and medicine. However, investigation of new nano preparations for treatment of different infectious diseases related with cattle reproductive system has significant interest.

The main aim of the study was the investigation of effectiveness of new nano liposomal preparation for treatment of cattle endometritis. For this purpose, we created new complex liposomal preparation with silver nanoparticles, vitamins and hormones. Transmission electron microscopy and light microscopy were used for characterization of preparations. For the study of therapeutic potential of new liposomal nano-product we examined their effectiveness for treatment of cattle endometritis. The cows with clinic symptoms of endometritis were treated intrauterus by liposomal nano-preparation at the dose of 20 ml/day during 6 days. The condition of the animals was monitored by ultrasound. Blood sampling for determine hematological and biochemical values was done two times: the day before the compounds administration and on day 7 after the compounds administration. The results showed that new liposomal nano-preparations have great efficiency (more 98%) for treatment of cattle endometritis. Those dates were confirmed by biochemical and hematological analysis of blood samples obtained before and after drug administration.

Therefore, new liposomal preparation has great positive effect on treatment of cattle endometritis without antibiotics and can be applied in livestock productions.

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ABSTRACT

POSTER 9

Changes in selected reproductive parameters in the Polish Olkuska sheep herd from the Wrocław University of Environmental and Life Sciences in 2012-2016

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The Polish Olkuska sheep is a native variation of long-wool sheep. It is characterized by high prolificacy (about 200%) and milk yield, developed maternal instinct and significant resistance to diseases and difficult environmental conditions. The herd of the Olkuska sheep was purchased by the Wrocław University of Environmental and Life Sciences in autumn 2011. Since then, it has been kept at the Agricultural Experimental Station in Wrocław. Sheep are used in the traditional system, one litter is obtained from them each year. The mating period takes place from October to December, the harem mating system is used. As part of the research, selected reproductive parameters of Olkuska sheep ewes, i.e., prolificacy and reproductive performance, were analyzed in 2012-2016 based on reports prepared for the Polish Sheep Association. The lowest prolificacy, 119.05% was observed in 2013. Since then, the herd prolificacy has steadily increased, in 2016 it was 173.68% and it was 45% higher compared to 2013. The herd's breeding productivity is constantly improving, in 2012 it was 91%, while in 2016 155.81% and it was 71% higher compared to the first year of use. Summing up, it can be concluded that breeding work carried out within the herd since 2012 results in a continuous improvement in prolificacy and reproductive performance of ewes.

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ABSTRACT

POSTER 10

Dairy cattle crossbreding and reproduction

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Dairy farming is one of the most important branches of agricultural production. It owes its high level to consistently conducted breeding work in the field of milk characteristics and type and structure characteristics. This would not be possible without the development of artificial insemination, whereby its huge advantage (as a method of breeding), is that the semen of the best fertilising bulls, after prior assessment of its genetic value, can be used on a large scale. Unfortunately, apart from the positive effects of breeding work (eg high productivity), negative ones connected with low-functional features are also becoming more and more frequent. These include deterioration of the cow's health as well as resistance to mastitis, fertility and longevity. Both the global and national population of the Holstein breed is becoming more and more inbred, which in turn translates into an increase in inbreeding depression. This is due to a decrease in genetic diversity within the entire population and an increase in relatedness, which is largely due to the excessive use of semen from the best fertilising bulls. An excellent solution to this situation is the use of interracial crossbreeding, which eliminates problems typical of inbreeding. It is a phenomenon contrary to inbreeding depression and affects not only functional features, but also production features. The aim of the study was to assess the impact of breeding dairy cattle between dairy breeds (Polish Holstein - Friesian with Swedish Red and Norwegian Red) on the results of reproduction.

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ABSTRACT

POSTER 11

Correlation between IBR/IPV infection and reproductive traits of polish red-and-white cows

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Infectious Bovine Rhinotracheitis (IBR) and Infectious Pustular Vulvo-Vaginitis (IPV) is one of virus diseases which cause serious economic loss. Moreover, it causes a decline in productivity, a decrease in forage intake and weight gain, as well as increase in death numbers, but also drop of fertility rates and rise of miscarriages number, which in turn entails veterinary costs. The aim of this work was to determine the influence of IBR/IPV occurrence on functional reproduction features in polish red-and-white cows from a single farm (n=100), such as intercalving period, interpregnancy interval, cases of stillborn calves and reproductive trucks diseases occurrence. To determine the presence of antibodies against IBR/IPV, ELISA test was used. Data concerning fertility rates were obtained from breeding documentation of each individual subject participating in research. The results of the conducted research indicated that the percentage of IBR/IPV infected cows was very low (6%). In cows with a negative serological test, a shorter intercalving period by 13 days and a shorter interpregnancy interval by 10 days were found compared to cows with seropositive score ($P>0.05$). There was no relationship between calf mortality and the occurrence of IBR/IPV infection in cows. The influence of IBR/IPV on the occurrence of genital tract diseases has not been demonstrated. Due to the low percentage of IBR/IPV animals in the herd, this research should be extended to include more animals and farms.

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1st International Conference: „Modern reproduction of livestock", Wroclaw, 26 January 2018

Dairy cattle crossbreeding and reproduction

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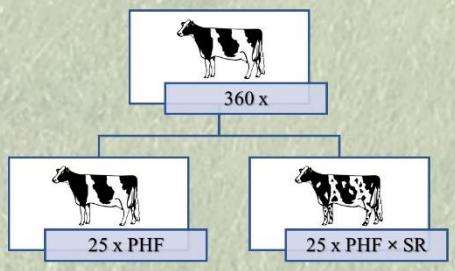
Introduction

Nowadays, milk processing is the most prominent way of using cattle for milk production in the world. Its significance is the effect of consistency of cattle breeding when it comes to the upgrading of milk production and improving the basic composition of milk. This wouldn't be achieved without the emergence of insemination, method that uses the semen of the best sires. Unfortunately, insemination, apart from being advantageous, happens to be increasingly problematic as it can result in issues connected with traits that are of low heritability, for instance, health, fertility and longevity. In such situation the semen of the best sires is of no benefit as it leads to additional negative effects in the form of reducing genetic diversity within the whole population of cattle, higher affinity, inbreeding or even inbreeding depression. Inbreeding depression results in the decrease of trait quality, thus, provoking lower milk production. However, it is not the only issue connected with excessive homozygosity within the population as it is possible that lethal traits which hinder cattle breeding can emerge along with homozygosity. All that makes farmers seek alternative solutions to such a situation.

One such solution may be crossbreeding which is a simple and well known method, that, thanks to heterosis, can quickly enhance the traits that are of highest importance for farmers. Heterosis is the opposite of breeding depression. Apart from having an impact on functional traits, it also influences productive ones. There is absolute certainty that inbreeding will not intensify when it comes to crossbreeding.

Materials and methods



The research was conducted in Agricultural Experimental Dairy Farm of Warsaw University of Life Sciences in Wilanów - Obory. Data comes from milk production evaluation and record books of heifers – cows were the basis for obtaining information on reproductive performance (age at first insemination, numer of days from first to last service, numer of services per lactation, age at first parturition, gestation length, calving and first service, numer of services per lactation, numer of days from first to last service, interpragnancy period, calving intrval, gestation length). Statistical data analysis was provided on the ground of one-way analysis of variance ANOVA. The analysis was carried out with the use of IMB SPSS Statistics software.

Results

Tab. 1. Repreduction parameters of PHF and PHF × SR heifer and primiparous

Heifer				
Reproduction parameters	**PHF**		**PHF × SR**	
	LSM	**SE**	**LSM**	**SE**
Age at first insemination	**459.33***	46.05	**443.32***	38.37
Number of days from first to last service	14.92	19.70	26.96	53.35
Number of services per lactation	1.50	0.66	1.56	0.77
Age at first parturition	754.46	47.48	751.12	63.37
Gastation lenght	280.21	5.78	280.84	9.10
Primiparous				
Calving and first service	**93.36***	32.43	**84.80***	24.87
Number of days from first to last service	**61.56***	75.02	**38.08***	54.46
Number of services per lactation	2.28	1.17	1.88	1.01
Interpregnancy period	**154.92***	88.07	**122.88***	51.82
Calving interval	353.92	105.41	347.40	118.65
Gestation length	276.39	11.89	280.65	8.65

*p≤0,05; LSM – least square of mean; SE – standard error of mean

Summary

As shown on the basis of the results, reproduction indicators of heifers did not provide positive effects of crossbreeding, it was during the lactation period when the effects occurred. It was then that all the reproductive parameters demonstrated lower values which proves the positive effects of crossbreeding. Yet, additional research should be carried out on different herds and breeds as there are no such research results with reference to Polish environmental conditions. It should also be noted that crossbreeding cannot be the priority of dairy cattle farmers.

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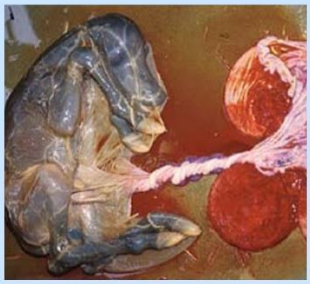
Immunoprofilaktyka aborcji u klaczy w wyniku zakażeń EHV-1

lek.wet. Angelika Orlewicz, dr inż. Anna Nienartowicz-Zdrojewska,
Bioveta Polska Sp. z o. o.

Infekcje herpeswirusowe u koni są bardzo powszechne. Największe znaczenie epidemiologiczne i ekonomiczne odgrywa EHV-1 należący do alphaherpesvirinae. Wirus ten odpowiedzialny jest za infekcje górnych dróg oddechowych, zakażenia układu nerwowego, rodzenie się słabych źrebiąt oraz ronienia. Do zakażenia może dochodzić poprzez kontakt bezpośredni z zakażonym osobnikiem (droga aerogenna) a także przez kontakt pośredni- zakażony sprzęt, poronione płody. Wrotami infekcji jest błona śluzowa górnych dróg oddechowych, następnie wirus replikuje się w komórkach nabłonka, przedostaje się przez błonę podstawną i za pomocą komórek dendrytycznych i makrofagów dostaje się do węzłów chłonnych, następuje trwająca kilka dni wiremia. Po przechorowaniu konie pozostają latentnie zakażone. W wyniku immunosupresji (stres, transport, krycie etc.) następuje aktywacja zakażenia latentnego i siewstwo wirusa.

U klaczy źrebnych wirus jest w stanie migrować do śródbłonka naczyń pępowinowych, gdzie namnażając się doprowadza do zapalenia naczyń krwionośnych płodu, zakrzepicy, niedokrwienia oraz w rezultacie do poronienia płodu. Ronienie w wyniku zakażeń EHV-1 przebiega bez wcześniejszych objawów zwiastujących, odsetek roniących w stadzie klaczy może dochodzić do 50%. Klacze ronią zwykle pomiędzy 7-11 miesiącem ciąży, od 6dni do 4miesięcy po zakażeniu. Poronione płody wykazują charakterystyczne zmiany anatomopatologiczne. Aborcje u klaczy to spory problem ekonomiczny – strata źrebięcia oraz czasu (333dni ciąży).



W celu ograniczenia strat spowodowanych zakażeniami herpeswirusowymi u koni już od drugiej połowy XX wieku trwają ciągłe badania nad opracowaniem skutecznych szczepionek.
W latach 1943-1952 w Kentucky stosowano szczepionki inaktywowane, które produkowano z narządów pochodzących od poronionych, zakażonych płodów. Następnie do produkcji inaktywowanych szczepionek używano antygenu namnożonego na chomikach (poprzez dootrzewnowe zakażanie chomików szczepem EHV- 1 Kentucky B lub D. W wielu krajach równolegle prowadzono badania mające na celu udoskonalenie preparatów zawierających inaktywowany wirus

Aktualnie na rynku polskim dostępne są szczepionki inaktywowane zawierające w składzie EHV-1: BioEquin H, BioEquin FH oraz Equip EHV 1,4.

Program szczepień klaczy źrebnych przy użyciu preparatów BioEquin obejmuje 3 szczepienia: w 2gim, 5-6 oraz 9 miesiącu ciąży. Utrzymywanie wysokiego poziomu przeciwciał przeciwko EHV-1 u klaczy źrebnych ma na celu ograniczenie występowania poronień. Szczepieniem ochronnym powinny być również objęte inne osobniki w stadzie (szczepienia bazowe oraz regularna rewakcynacja co 6 miesięcy) – pozwala to w znacznym stopniu zmniejszyć cyrkulacje wirusa w grupie zwierząt. Oprócz prowadzenia immunoprofilaktyki w celu minimalizacji odsetka ronień wywołanych EHV ważne jest odpowiednie zarządzanie hodowlą – kwarantanna nowych osobników (21dni), dzielenie koni na grupy wiekowe, odizolowanie klaczy źrebnych od reszty stada.

Equine herpesvirus type 1 (EHV-1, belongs to the Alphaherpesvirinae subfamily) is the major cause of respiratory disease, encephalomyelitis, neonatal foal death and abortions in pregnant mares. The infection spreads by inhalation of the aerosolised infectious virus or close contact with aborted fetuses and fomites. Lifelong latency has been demonstrated in lymphatic tissues draining the respiratory tract and in peripheral blood leukocytes, from where the virus can be periodically reactivated.
In order to reduce circulation of the virus in the horse population and to reduce the risk of abortion in mares, it is recommended to conduct immunoprophylaxis using inactivated vaccines.

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Leptospiroza a plenność w stadach trzody chlewnej

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Leptospirozy wywoływane są przez ponad 300 serowarów krętków. Chorują zarówno zwierzęta udomowione i dziko żyjące, jak i człowiek.

Wrotami zakażenia są błony śluzowe i rany skóry. Gdy bakterie skolonizują nerki organizm staje się nosicielem, wydalając krętki z moczem. Duże znaczenie w rozprzestrzenianiu choroby mają gryzonie.

Leptospiroza trzody chlewnej

- najgroźniejsze dla świń są serotypy L. pomona i L. bratislava,
- krętki wykazują tropizm do nerek, w których się szybko namnażają,
- częste są enzootyczne zakażenia stad – zarówno loch jak i knurów,
- najwyższe stężenie w środowisku występuje 3-4 tygodnie po zakażeniu,
- w przypadku zakażeń przezłożyskowych następuje śmierć płodów i poronienia,
- leczenie zwierząt nie wystarczy aby uwolnić stado od leptospirozy

KONIECZNE SĄ CYKLICZNE SZCZEPIENIA I DERATYZACJA

Występowanie leptospir w stadach trzody chlewnej w Polsce, z uwzględnieniem serotypów.

	Liczba próbek	Liczba wyników dodatnich	Liczba badanych stad	Liczba stad dodatnich
2002	8082	203 (2,51%)	190	39 (20,52 %)
2003	6489	123 (1,90%)	173	26 (15,03 %)

	2002 r.	2003 r.
Pomona	56,20%	45,50%
Sejroe	19,20%	39,60%
Tarassovi	11,30%	10,60%
Icterohemorhagiae	10,40%	1,60%
Grippothyphosa	0,90%	4,90%
Canicola	1,90%	0,00%

W celu ochrony stada przed zachorowaniem oraz obniżenia siewstwa leptospir stosuje się szczepienia ochronne – **Biosuis Parvo L(6).**

W opracowaniu szczepionki brano pod uwagę częstotliwość występowania poszczególnych serowarów leptospir w stadach trzody chlewnej. Dodatkowo szczepionka ta posiada komponent parwowirusa.

Czynne uodpornianie loch i loszek, w celu zapobiegania zakażeniom wewnątrzmacicznym, obejmuje dwukrotne szczepienie przed pierwszym kryciem oraz podawanie dawki przypominającej **na 2-3 tygodnie przed każdym kryciem**. U knurów uodpornienie następuje po 2 dawkach podawanych w odstępie 2-3 tygodni, tak by druga dawka przypadała na 2-3 tygodnie przed kryciem lub pobieraniem nasienia. Następnie **knury szczepi się co 4 miesiące dawką przypominającą.**

Leptospira pomona introduced into a herd become permanent carriers with infection of the kidneys and intermittent excretion of the organism into the urine. L. bratislava also permanently inhabit the fallopian tube of sows and the reproductive organs of boars and they are spread in semen. Immunisation induces production of specific antibodies that protect embryos and foetuses of gilts and sows against parvovirosis and leptospirosis for the whole period of pregnancy. The high titres of postvaccination antibodies in boars prevent parvovirus and leptospira replication in the genitals and reduce the risk of infection transmission during mating. Vaccination using Biosuis Parvo L(6) prevent sows, gilts and boars against porcine parvovirosis and leptospirosis. **Gilts and sows:** two doses: 4 – 5 weeks prior to covering and in 2 – 3 weeks after vaccination is revaccination performed so that it is accomplished 2 – 3 weeks prior to covering. Further regular vaccinations always with one dose 2 – 4 weeks prior to covering.
Boars: 4 – 5 weeks prior to first covering or ejaculate collection and in 2 – 3 weeks after vaccination, a revaccination is performed so that it is accomplished 2 – 3 weeks prior to first covering or inclusion of the boar to artificial insemination. Further regular vaccination always with one vaccination dose of the BIOSUIS PARVO L (6) in sows and gilts 2 - 4 weeks prior to covering and in boars always one vaccination dose administered regularly within 6 months from the last vaccination. This immunisation procedure ensures protection of embryos and foetuses in sows and gilts against parvovirosis and leptospirosis and decrease the risk of transmitting parvovirus and leptospira from boars.

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NAJLEPSZE Z NAJLEPSZYCH

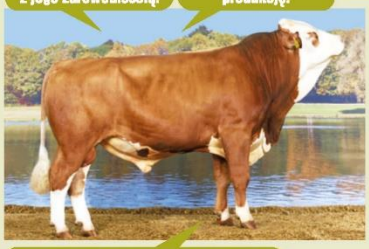
buhaje simentalskie o najwyższych parametrach wśród wybranych cech

Najlepsze parametry dla budowy wymienia (E)

MONUMENTAL ur. 29.10.2014 r. DE0949729097

Budowa wymienia ma bezpośredni związek z jego zdrowotnością.

Zdrowe wymię oznacza stabilną i wysoką produkcję.



Prawidłowo zbudowane i zdrowe wymię ma bezpośredni wpływ na zmniejszenie liczby brakowanych zwierząt.

gGZW łączny indeks hodowlany	E
133	124

Cechy produkcyjne	
MW	120
mleko [kg]	+1017
tłuszcz [kg]	+22
% tłuszczu	-0,24
białko [kg]	+35
% białka	-0,01
Cechy funkcjonalne	
FITNESS	118
MBK	104
PERS	100
ZZ	112
ND	121

Najwyższy indeks FW – indeks dla cech mięsnych

VITAMIN ur. 20.12.2012 r. DE0947331697

Urodzone cielęta cechuje lepsze wykorzystanie paszy i szybkie przyrosty.

Uzyskane mięso ma wysoką jakość i klasę handlową.

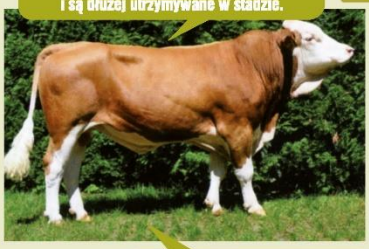
gGZW łączny indeks hodowlany	FW
133	136

Cechy produkcyjne	
MW	111
mleko [kg]	+610
tłuszcz [kg]	+16
% tłuszczu	-0,11
białko [kg]	+16
% białka	-0,07
Cechy funkcjonalne	
FITNESS	115
MBK	96
PERS	120
ZZ	108
ND	116

Najlepsze parametry dla nóg i racic (F)

MANIGO ur. 1.07.2008 r. DE0943304203

Krowy o zdrowych nogach wymagają mniejszych kosztów związanych z leczeniem i są dłużej utrzymywane w stadzie.



Zdrowe nogi i racice to lepsze wyniki w rozrodzie, mniej zużytych porcji nasienia na skuteczne pokrycie.

gGZW łączny indeks hodowlany	F
132	134

Cechy produkcyjne	
MW	115
mleko [kg]	+639
tłuszcz [kg]	+13
% tłuszczu	-0,17
białko [kg]	+27
% białka	+0,06
Cechy funkcjonalne	
FITNESS	120
MBK	88
PERS	106
ZZ	131
ND	114

Najlepszy indeks MW – produkcja i skład mleka

HALLELUJA ur. 20.02.2015 r. DE0949731234

Córki tego buhaja będą charakteryzować się wysokim potencjałem genetycznym dla produkcji mleka.

Dodatkowo buhaj ten poprawia kaliber i budowę wymienia.

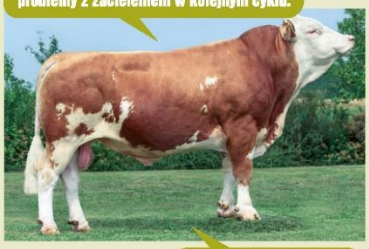
gGZW łączny indeks hodowlany	MW
126	135

Cechy produkcyjne	
MW	135
mleko [kg]	+1344
tłuszcz [kg]	+60
% tłuszczu	+0,05
białko [kg]	+38
% białka	-0,10
Cechy funkcjonalne	
FITNESS	99
MBK	94
PERS	116
ZZ	99
ND	100

Najwyższy indeks Kp – łatwość wycieleń, komp. ojcowski

MANDRIN ur. 30.12.2009 r. AT650446817

Łatwy poród to dobry start do wysokiej produkcji mleka oraz mniejsze problemy z zacieleniem w kolejnym cyklu.



Wysoki procent łatwych porodów poprawia efekt ekonomiczny całego stada.

gGZW łączny indeks hodowlany	Kp
131	123

Cechy produkcyjne	
MW	122
mleko [kg]	+1046
tłuszcz [kg]	+33
% tłuszczu	-0,12
białko [kg]	+32
% białka	-0,05
Cechy funkcjonalne	
FITNESS	109
MBK	98
PERS	104
ZZ	108
ND	106

Najlepsza zdrowotność wymienia (EGW) i kom. som. (ZZ)

GALYANO ur. 12.01.2014 r. DE0949095988

Mniej klinicznych i podklinicznych zapaleń wymienia.

Ograniczenie strat związanych z obniżeniem jakości pozyskiwanego mleka.

Mniejsza liczba komórek somatycznych w mleku.

gGZW łączny indeks hodowlany	EGW
123	122

Cechy produkcyjne	
MW	108
mleko [kg]	+277
tłuszcz [kg]	+19
% tłuszczu	+0,09
białko [kg]	+6
% białka	-0,05
Cechy funkcjonalne	
FITNESS	121
MBK	112
PERS	113
ZZ	120
ND	122

ZAMÓWIENIA I DYSTRYBUCJA NASIENIA: PIOTR MAJCHROWSKI, TEL. 607-803-904

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NAJWYŻSZA JAKOŚĆ W MCB SP. Z O.O.

W 2016 roku w Małopolskim Centrum Biotechniki Sp. z o.o. zs. w Krasnem wystartował projekt, którego celem jest opracowanie i wdrożenie do praktyki produkcyjno-hodowlanej kompleksowego systemu oceny nasienia młodych buhajów z opracowaniem nowych standardów określających wysoką biologiczną jakość ich nasienia.

Odbyliśmy wiele szkoleń krajowych i zagranicznych, uzyskując odpowiednie certyfikaty!

To nowy rozdział w regularnej produkcji nasienia w MCB Sp. z o.o. Do tej pory tego rodzaju sprzęt był stosowany wyłącznie w laboratoriach badawczych. Jesteśmy pierwsi w Polsce i nieliczni w Europie, którzy wykorzystują cytometrię przepływową w bieżącej produkcji i ocenie nasienia buhajów.

Celem realizowanych w MCB Sp. z o.o. badań jest opracowanie i wdrożenie do praktyki kompleksowego systemu oceny nasienia młodych buhajów simentalskich oraz polskich holsztyńsko-fryzyjskich odmiany czerwono-białej. Dążymy do opracowania norm dla ocenianych cech tak, aby do hodowców trafiał zawsze produkt sprawdzony o najwyższej jakości.

Efektem wdrożonego w MCB Sp. z o.o. projektu jest kompletna metoda pozwalająca na kwalifikację pierwszych i kolejnych ejakulatów młodych buhajów na potrzeby inseminacji w hodowli bydła.

Projekt realizowany jest wspólnie z Działem Biotechnologii Rozrodu Zwierząt Instytutu Zootechniki w Balicach – Państwowego Instytutu Badawczego.

HODOWCO!

Produkt jakim jest słomka zawierająca nasienie buhaja składa się z trzech bardzo ważnych elementów stanowiących wartość dla hodowcy:

1. **<u>bezpieczeństwo sanitarne</u> – wszystkie buhaje w stacji poddane są rygorystycznej procedurze sanitarno-weterynaryjnej mającej na celu wykluczenie chorób, które przenoszą się z nasieniem i mają wpływ na płodność samców i samic;**
2. **<u>wartość hodowlana lub wartość genów jakie niesie z sobą plemnik</u> – jest to efekt realizowanych programów hodowlanych i ostatecznie wartości genetycznej buhaja jako ojca następnego pokolenia. Z założenia oferujemy buhaje o najwyższej wartości;**
3. **<u>wartość biologiczna nasienia</u> – efekt wdrożonych procedur oceny ejakulatów i poszczególnych plemników mający zagwarantować hodowcy najwyższą możliwą skuteczność po inseminacji.**

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