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ABSTRACTS

BIOLOGY

TI: A NEW CANESTRINIID MITE, PARAPHAGELLA GRIMALDI SP. N. (ACARI: ASTIGMATA: ANESTRINIIDAE), COLLECTED FROM CHELORRHINA POLYPHEMUS (FABRICIUS, 1781) (COLEOPTERA: SCARABAEIDAE: CETONIINAE) FROM CAMEROON

AU: Haitlinger R.

AD: Institute of Biology, Department of Systematics and Ecology of Invertebrates, Wrocław University of Environmental and Life Sciences

LA: English

AB: *Paraphagella grimaldi* sp. n. (*Acari: Astigmata: Canestriniidae*) collected from *Chelorrhina polyphemus* (Fabricius) (*Coleoptera: Scarabaeidae: Cetoniinae*) from Cameroon is described. The formal taxonomic description and illustrations are derived from adults (female and male).

DE: Acari, Canestriniidae, *Paraphagella grimaldi*, new species, Cameroon

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 15–20.

TI: *ANTENNOSEIUS* (*ANTENNOSEIUS*) *OLALLAE* SP. N. (*ACARI: MESOSTIGMATA: ASCIDAE*) FROM ARGENTINA

AU: Haitlinger R.

AD: Institute of Biology, Department of Systematics and Ecology of Invertebrates, Wrocław University of Environmental and Life Sciences

LA: English

AB: *Antennoseius* (*Antennoseius*) *olallae* sp. n. collected from undetermined *Carabidae* (*Coleoptera*) is described from Argentina.

DE: *Acari, Mesostigmata, Ascidae Antennoseius* (*Antennoseius*) *olallae* new species, Argentina

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 21–25.

TI: *CHARLETONIA POSTOJNENSIS* N. SP. AND THEFIRST RECORD OF *HAUPTMANNIA PODORASENSIS* HAITLINGER, 2007 (ACARI: PROSTIGMATA: ERYTHRAEIDAE) FROM SLOVENIA

AU: Haitlinger R.

AD: Institute of Biology, Department of Systematics and Ecology of Invertebrates, Wrocław University of Environmental and Life Sciences

LA: English

AB: *Charletonia postojnensis* n. sp. is described from Slovenia. The species of the genus *Charletonia* is recorded for the first time from *Psyllidae* (Homoptera). *Hauptmannia podoirasensis* is recorded for the first time from Slovenia.

DE: Acari, Erythraeidae, *Charletonia postojnensis, Hauptmannia podorasensis*, new species, new record, Slovenia

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 27–32.

TI: FIRSTRECORD OF ABROLOPHUS AITAPENSIS (SOUTHCOTT, 1948) AND *LEPTUS* (*LEPTUS*) *CABARETICUS* HAITLINGER, 2004 (ACARI: PROSTI-GMATA: ERYTHRAEIDAE) FROM GUADELOUPE

AU: Haitlinger R.

AD: Institute of Biology, Department of Systematics and Ecology of Invertebrates, Wrocław University of Environmental and Life Sciences

LA: English

AB: *Abrolophus aitapensis* and *Leptus (Leptus) cabareticus* for the first time are reported from Guadeloupe. *A. aitapensis* is the second species of the genus *Abrolophus* stated in America.

DE: Acari, Erythraeidae, *Abrolophus aitapensis*, *Leptus* (*Leptus*) *cabareticus*, new records, Guadeloupe

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 33–35.

TI: RED BLOOD CELL PARAMETERS IN BARN SWALLOW *HIRUNDO RUSTICA* CHICKS FROM EARLY AND LATE BROODS

AU: Kasprzak M.[1], Bocheński M.[1], Czechowski P.[2], Steliga A.[3], Jędro G.[4], Jerzak L.[1]

AD: [1] Department of Zoology, University of Zielona Góra
[2] Vocational Higher Education School in Sulechów, Institute of Tourism and Recreation
[3] Pomeranian University of Slupsk, Department of Health Sciences
[4] Slovinski National Park

LA: Polish

AB: Burn Swallow Hirundo rustica chicks from earlier (N=35) and later (N=20) broods were examined. Basic red blood cell parameters were studied: number of red blood cells *RBC*, haemoglobin concentration *Hgb* and haematocrit *Hct*. According to this, three main red blood cell indices were calculated: mean corpuscular volume *MCV*, mean corpuscular haemoglobin *MCH* and mean corpuscular haemoglobin concentration *MCHC*. After standardization, results of both groups were compared. Chick from earlier brood had significantly lower number of *RBC* as well as *Hct*. However, they had significantly higher *Hgb*, thus higher value of *MCH* and *MCHC*. Better saturated with haemoglobin red blood cells of chicks from early broods indicate their better energetic possibilities and better physiological condition.

DE: Burn Swallow, Hirundo rustica, number of red blood cells *RBC*, haemoglobin concentration *Hgb*, haematocrit *Hct*,: mean corpuscular volume *MCV*, mean corpuscular haemoglobin *MCH*, mean corpuscular haemoglobin concentration *MCHC*

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 37–44.

TI: MORPHOLOGICAL ABNORMALITIES IN MITESOF THE GENUS *ERYTHRAEUS* LATREILLE, 1806 (ACARI: ACTINOTRICHIDA: ERYTHRAEIDAE) FROM FINLAND

AU: Roland E.[1], Gabryś G.[1, 2]

AD: [1] Department of Zoology, University of Zielona Góra
[2] Department of Invertebrate Systematics and Ecology, Institute of Biology, Wrocław University of Environmental and Life Sciences

LA: English

AB: The anomalies and malformations in mites of the genus *Erythraeus* Latreille, 1806 are described for the first time. Morphological abnormalities were found on palps, posterior sensillary area of crista metopica, and legs in seven specimens of four species and one specimen determined to the genus.

DE: Parasitengona, postlarval Erythraeoidea, anomalies, malformations, teratology

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 45–53.

TI: MANGANESE AND IRON IN COMMON REED IN THE JAMNO LAKE

AU: Senze M., Pokorny P., Kowalska-Góralska M.

AD: Institute of Biology, Department of Hydrobiology and Aquaculture, Wrocław University of Environmental and Life Sciences

LA: Polish

AB: Research was carried out of the natural environment of the Jamno Lake. As part of the research samples of aquatic plants (common reed (*Phragmites australis* (Cav.) Trin. ex Steud.) and lake water were taken. Material was sampled at 5 sites: Strzeżenice, channel Jamieński Nurt, Mielno-Unieście, Łazy and Osieki. For the samples taken water content of the manganese and iron were determined.
In the water samples content of iron and the manganese were only found in channel Jamieński Nurt site. The maximum concentration of iron in the water samples taken was found to be 1,7411 $mgFe \cdot dm^{-3}$ and manganese 0,5066 $mgMn \cdot dm^{-3}$.
The range concentrations of metals in the plant samples (common reed) were as follows: iron 615,08–718,45 $mgFe \cdot kg^{-1}$ and manganese 76,14–208,39 $mgMn \cdot kg^{-1}$.
The accumulation rates (BCF) for metals in common reed were amounting to BCF = 399,90 (iron) and BCF = 355,48 (manganese).
Metal concentrations in the sampled water and plants were found to be similar to those in slightly polluted surface waters.

DE: iron, manganese, lakes, water, aquatic plants

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 55–64.

TI: DIET OF BARN OWL *TYTO ALBA* (SCOPOLI, 1769) IN LUBUSKIE REGION

AU: Ważna A.[1], Cichocki J.[1], Łupicki D.[2], Rubacha S.[3], Wąsicki A.[3], Gabryś G.[1,2]

AD: [1] Department of Zoology, University of Zielona Góra
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[3] Voivodship Inspectorate for Environmental Protection in Zielona Góra

LA: Polish

AB: The research was aimed to determine the composition of barn owl *Tyto alba* diet in Lubuskie region. Research material was gathered between 2003 and 2005 on 75 barn owl stations. Research stations were located mainly on church towers.
From the gathered material, a total of 30,352 victims were preparated. The victims belonged to 28 mammals' species from three orders: Soricomorpha, rodents Rodentia and bats Chiroptera, as well as birds Aves and tailless amphibians Anura. The percentage composition of barn owl's diet in particular poviats of the region is presented in Tables 1–

11. Basic diet of barn owl are rodents, 52,1%. However, a high percentage of Soricomorpha (46,7%) is characteristic for Lubuskie region. It is probably due to an abundance of marshy environments. In the research, samples of pellet material from 49 stations, voivodship-wide, were gathered. They have not been included in quantitative analysis, although they serve as a source of information for faunistic compilations of Lubuskie region teriofauna.

DE: Strigiformes, diet, Lubuskie region, Micromammalia, Insectivora, Chiroptera, Rodentia

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 65–87.

ANIMAL BREEDING

TI: THE EFFECT OF OAT GRAIN GERMINATION AND DRYING ON LIPID QUALITY AND α-TOCOPHEROL CONTENT

AU: Antoszkiewicz Z., Pasera B., Purwin C., Lipiński K.

AD: Department of Animal Nutrition and Feed Science, University of Warmia and Mazury in Olsztyn

LA: Polish

AB: The objective of this study was to determine lipid quality and the α-tocopherol content of oat grain, germinated and dried at various temperatures. Spring oat grain was dried for 20 hours, at 60°C or 105°C. Oat grain (67% DM) was germinated at room temperature for three days. Part of the germinated grain was analyzed immediately, and the other part was dried for 20 hours at 60°C or 105°C. Samples of fresh and dried grain were assayed for proximate chemical composition, lipid quality (acid value, peroxide value, saponification value, TBA) and α-tocopherol content. Acid value (AV) is a measure of the amount of free fatty acids and an indicator of undesirable changes in lipid quality. The highest AV was determined in fresh germinated grain and in unprocessed grain (4,49 and 1.99 mg KOH g^{-1} DM respectively). Lower acid values were noted in dried grain, and in germinated grain dried at 60°C or 105°C (1.19 and 0.23, 0.34 and 0.18 mg KOH g^{-1} DM respectively). Peroxide value (PV), which is a measure of the rate of oxidation processes, reached the highest level in fresh germinated grain and in unprocessed grain (3,52 i 6,95 meq kg^{-1} DM). Relatively low peroxide values were observed in dried grain (0,96 i 0,30 meq kg^{-1} DM) and in dried germinated grain (0,79 i 0,45 meq kg^{-1} DM respectively). A high saponification value (SV) is indicative of lipid hydrolysis and increased concentrations of short-chain fatty acids, resulting from hydrolytic and oxidative decomposition of lipids. The lowest SV was reported for unprocessed grain (222,9 mg KOH g^{-1} DM, while germination caused an increase in SV (410,65 mg KOH g-1 DM). Slightly higher SV was noted in dried grain, both germinated and non-germinated (193,65 and 190,76, 204,48 and 198,20 mg KOH g-1 DM respectively). TBA content is a measure of the rate of fatty acid oxidation leading to the accumulation of malondialdehyde (MDA). Unprocessed oat grain was characterized by the lowest MDA content (0.66 μMkg^{-1}), whereas the MDA content of fresh germinated grain was over eleven-fold higher (7,54 μM kg^{-1}). Grain drying supported an increase in MDA content (3.51 and 4,03, 4,33 and 4.41 respectively). Unprocessed oat grain and germinated oat grain had a higher α-tocopherol content (5.33 and 53.53 mg kg^{-1} DM respectively), compared with dried grain where vitamin E concentrations were over 87% and 97% lower, respectively. The α-tocopherol content of germinated dried grain (60°C and 105°C) accounted for 21% and around 2%, respectively, of its level determined in fresh germinated grain.

The obtained results (TBA) show that grain drying and germination enhances lipid oxidation. High drying temperatures (over 60°C) decrease the levels of natural antioxidants

(vitamin E). Lower AV, PV and SV determined in dried grain suggest that high temperatures contribute to partial loss lipid hydrolysis.

DE: oat grain, fat numbers, malondialdehyde, α-tocopherol

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 89–99.

TI: THE ESTIMATION OF ENSILING EFFECTIVENESS OF MAIZE-FIELD BEAN MIXTURE WITH USE OF BACTERIAL INOCULANTS

AU: Bodarski R.[1], Szyszkowska A.[1], Sowiński J.[2], Sobczyk I.[1]

AD: [1] Department of Animal Nutrition and Feed Science, Wrocław University of Environmental and Life Sciences
[2] Department of Crop Production, Wrocław University of Environmental and Life Sciences

LA: Polish

AB: The aim of the conducted investigations was the estimation of the effectiveness of silage from whole maize plant mixed with soybean production with application of microbiological additives. The plant material derived from experimental fields, in which the maize and field bean were vegetated individually. The field bean (cv. Nadwislanski) was harvested after 12 weeks of vegetation, meanwhile the maize (Wilga hybrid) was in wax stage of maturity. The six treatments of silages were performed: maize without additives; maize with microbiological additive I; maize with micro-biological additive II; mixed maize and field bean without additives; mixed maize and field bean with microbiological additive I; mixed maize and field bean with microbiological additive II. The maize were mixed with soybean in proportion of 50:50% calculated on fresh matter. The inoculant I included *Lactobacillus casei Osmo 254, Enterococcus faecium CCM 6226, Lactobacillus casei F 19, Lactobacillus plantarum CCM 3769, Pediococcus pentosaceus CCM 3770, Lactobacillus lactis CCM 4754*, and the inoculants II consisted of *Lactobacillus buchneri, Enterococcus faecium M 74, Lactobacillus casei, Lactobacillus plantarum, Pediococcus ssp*.
The silages composed from the mixture of maize and field bean in comparison to maize silage itself contained more by 1.35 percent points of crude protein, less amount of NDF (683.6 vs. 764.6 $g \cdot kg^{-1}$ DM) and ADF (310.4 vs. 333,7 $g \cdot kg^{-1}$ DM), higher amount of acetic acid (18.75 vs. 9.58 $g \cdot kg^{-1}$ DM) and lower of lactic acid (41.29 vs. 53.05 $g \cdot kg^{-1}$ DM). Moreover, these silages were less acidifying (pH 4.03 vs. 3.95) but more stable in air condition. The silages made with addition of biological inoculants in comparison to the ones made without additives were characterized by lower fiber fraction amounts but higher level of lactic acid. After application of additives the losses of dry matter and protein during preservation decreased. The silages made with inoculant I contained less amount of acetic acid, whereas silages made with inoculant II contained more amount of this acid. The inoculant I containing lactic homofermentative bacteria prejudiced oxygen stability of silages whereas inoculant II containing heterofermentative bacteria *Lactobacillus buchneri* – improved it.

DE: silage, maize, field bean, chemical composition, quality, aerobic stability

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 101–110.

TI: EFFECT OFFEEDING DRY MAIZE GRAIN ANDHIGH-MOISTURE MAIZE GRAIN SILAGE ON FATTY ACID PROFILE AND CHOLESTEROL CONTENT IN LAMBS MEAT

AU: Borowiec F., Karpowicz A., Cembrzyńska M., Pyś J.B.

AD: Department of Animal Nutrition and Feed Management, University of Agriculture in Kraków

LA: Polish

AB: The objective of the study was to determine the effect of feeding diets based on dry maize grain or high-moisture maize grain silage on body weight gains and chemical composition of weaned lambs meat. The experiment was carried out on 15 male lambs of Polish Longwool sheep, aged 4 months and body weight of 28.7 kg. Animals were divided into 3 experimental groups. Basal feeding ratio for all experimental groups consisted of: meadow hay – 0.6–0.8 kg/animal and CJ mixture – 0.25–0.30 kg/animal. Additionally, animals were fed with: control group (K) – barley grain meal in amount equal to 0.3–0.4 kg/animal, group I (D1) – dry maize grain – 0.25–0.30 kg/animal and group II (D2) – high-moisture maize grain silage – 0.4–0.5 kg/animal. The diets were isoprotein and isoenergetic. After 79 days animals were slaughtered. Carcass yield, chemical composition, cholesterol content and fatty acids profile in lambs hind leg samples were determined.
Ensiling high-moisture maize grain decreased NDF, ADF, ADL, water soluble carbohydrates, starch and polyunsaturated fatty acids content, as well as effected with higher saturated and monounsaturated fatty acids level, as compared to control group. High-moisture maize grain silage was willingly consumed by lambs and did not decrease their body weight. Feeding lambs with maize grain decreased cholesterol content in hind leg tissue. No significant changes in fatty acids profile in hind leg tissue were observed.

DE: lambs, ensiled maize grain, body gains, cholesterol, fatty acid profile

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 111–121.

TI: THE EFFECT OF DIETARY PROTEIN ANDAMINO ACID SUPPLEMENTATION ON NITROGEN METABOLISM AND FATTENING TRAITS IN GROWING-FINI-SHING PIGS

AU: Drażbo A., Sobotka W.

AD: Animal Nutrition and Feed Management, University of Warmia and Mazury, Olsztyn

LA: Polish

AB: In the research was to determine the effect of different inclusion levels of crude protein and amino acids (lysine, methionine, threonine and tryptophan) in diets for growing-finishing on nitrogen retention and utilization, daily gains, feed conversion ratio. The animals were fed complete grower and finisher diets: diet W (control) containing 17.92% protein and 0.98% lysine, diet ,,N'' with a reduced (by 15%) content of total protein (15.36%) and exogenous amino acids, diet ,,N+AA'' with a reduced crude protein concentration, supplemented with lysine, methionine, threonine and tryptophan to the level determined in group „W".
Nitrogen retention levels were statistically non-significantly lower in group N pigs fed grower and finisher diets whose crude protein content was reduced by 15%. An improvement in the utilization of nitrogen taken up and digested was noted in this group. Diet supplementation with amino acids (lysine, methionine, threonine and tryptophan – ,,N+AA'') increased nitrogen retention and had a beneficial influence on nitrogen utilization. The analyzed experimental factors had no significant effect on fattening results. It has been reported less consumption crude protein per kg body weight as result of reduction of 15% crude protein in feed mixtures. The supplementation of low-protein diets with crystalline lysine, methionine, threonine and tryptophan had a further positive impact on the value of the analyzed indicator.

DE: different protein and amino acid levels, nitrogen metabolism, fattening results, pigs

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 123–129.

TI: THE INFLUENCE OF PRODUCTS CONTAINED MANNANS AND β-D-1,3/1,6-GLUCANS ON THE PRODUCTION AND PHYSIOLOGY RESULTS OF PIGLETS DURING WEANING PERIOD

AU: Fuchs B.[1], Frericks J.[2], Szuba-Trznadel A.[1], Ragaller V.[2], Lira R.[3]

AD: [1] Department of Anomal Nutrition and Feed Quality, Wrocław University of Environmental and Life Sciences
[2] Leiber. GmbH – Bramsche
[3] The LIRA Feed Manufacture

LA: Polish

AB: The aim of the study was to assess the production and the physiology results and the bacterial analyses of excrement of suckling and weaner piglets which received the Biolex products with different concentration of mannans and β-D-1,3/1,6-glucans. The animals from groups II were given the prestarter mixture with an additive of Biolex A contained (in 1 kg of feed) 0.8 g mannans and 0,14 g β-D-1,3/1,6-glucans. Animals from group III were given the same basal prestarter mixture contained (in 1 kg of feed) 0.4 g mannans i 0.6 g β-D-1,3/1,6-glucans supplement called the Biolex B. Group I was treated as negative control. Application of Biolex caused that the rate of growth, feed conversion and health condition of animals were better. The inhibition of excessive growth of number of *Escherichia coli* and *Clostridium sp.* were noted in groups of animals which received Biolex in the mixture.

DE: β-D-1,3/1,6-glucans, mannans, piglets, growth, health condition

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 131–141.

TI: COMPARISON OFTRAIT FATTENING AND CARCASS QUALITY OF CROSS-BREED FATTENERS IN INDUSTRIAL PIGFARM

AU: Gajewczyk P., Akińcza J.

AD: Department of Pigs Breeding, Institute of Animal Breeding, Wrocław University of Environmental and Life Sciences

LA: Polish

AB: One of the ways of improving the economically important features is the execution of pigs crossing programmes. On many farms specialised in fatteners production in our country, as the female material, crossbreed sows obtained from the crossbreeding of Large White Polish and Polish Landrace are used. Sows are then convered by boars of the same breed or other breeds of foreign origin.

The conducted research aimed to compare the fattening, slaughter and meat value of crossbreed fatteners. 720 animals at similar age of about 180 days, that with respect of the genotype were divided into 6 groups, were assessed. Basing on the research carried out it was stated that, as regards the growth rate, crossbreed fatteners obtained as a results of return crossing with polish breeds participation and simple crossing with 990 line boars participation, were definitely better than individuals obtained with crossbreed sows [LWP x PL] and crossbreed boars [Hampshire x Pietrain] participation. The boars of meat breeds of foreign origin contributed to the shortening of the middle carcass length in offspring, but improved its muscularity.

DE: crossbreed fatteners, fattening and slaughter value

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 143–147.

TI: ASSESSMENT OFSEMEN CHARACTERISTICS IN MUSCOVY DRAKE (*CAI-RINA MOSCHATA*)

AU: Gerzilov V.

AD: Department of Animal Science, Agricultural University Plovdiv, Bulgaria

LA: English

AB: This study was carried out over six year period with total 51 one-year-old Muscovy drakes (6–12 males each year) in the months from April to July. Two times per week semen samples were collected individually by putting a female in each male occupied cage (teaser method). The total number of collected and evaluated ejaculates was 1154. The average values of the evaluated parameters were: ejaculate volume – 1.16 ±0.01 mL; sperm mobility – 73.02 ±0.33%; sperm concentration – 1799 ±33 spz x106/mL; pH-value – 6.99 ±0.01; methylene blue reduction test – 332 ±8 sec; normal living spermatozoa – 79.43 ±0.74%; abnormal spermatozoa – 11.34 ±0.47% and dead spermatozoa – 9.10 ±0.29%. During the reproductive period the average values of the ejaculate volume significantly increased ($P<0.001$) from April to July. Sperm mobility decreased during June compared to April and May ($P<0.001$), and also during the July compared to April, May and June – ($P<0.001$). No significant variation in the sperm concentration during the reproductive season was observed.

The distribution of the ejaculate parameter values for the majority of individuals gave the following ranges: ejaculate volume from 0.8 to 1.6 mL – 55.28%; sperm mobility from 70 to 89 – 72.49% and sperm concentration from 801 to 2000 spz x106/mL – 62.45%

DE: Muscovy duck, semen characteristics

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 149–156.

TI: EFFECT OFCRYOPROTECTANTS ON THE MOBILITY AND THE MORPHO-LOGICAL INTEGRITY OF MUSCOVY SPERMATOZOA

AU: Gerzilov V.[1], Kazachka D.[2], Jeleva S.[2], Petrov P.[1], Sabev M.[3], Nikolov I.[3]

AD: [1] Department of Animal Sciences, Agricultural University – Plovdiv, Bulgaria
[2] National Diagnostic and Research Veterinary Medical Institute – Sofia, Bulgaria
[3] Department of Cryobiology, Institute of Biology and Immunology of Reproduction – Sofia, Bulgaria

LA: English

AB: In this study the effect of six cryoprotectans – glycerol, dimethyl sulfoxide, polyethylene glycol, thiodiethylene glycol, ethylene glycol and diethyl glycol on the cryopreservation of Muscovy drake semen was investigated.

The semen was collected twice a week from 9 one-year-old Muscovy drakes, with artificial vagina and a female as teaser. Semen samples were diluted 1:1 (semen:diluent) with HIA-1 diluent enriched with 15% egg yolk (v/v), equilibrated at 4°C for 30 min without cryoprotectant and once again equilibrated in the same conditions with one of the six tested cryoprotectants in final concentration of 5%, dispensed into plastic straws, prefrozen to -140°C at 60°C/min and plunged into liquid nitrogen container. The thawing procedure was conducted in a water bath at 42°C.

Cryopreservation of Muscovy drake semen affected the morphological integrity and motility of spermatozoa. The use of glycerol was more successful in contrast to other cryoprotective agents, in relation to sperm mobility and morphological integrity. The sperm mobility were 36.43 ±2.66% with glycerol, 24.40 ±1.68% with dimethyl sulfoxide, 12.33 ±4.55% with ethylene glycol, 8.33 ±2.04% with polyethylene glycol, 1.85 ±1.25% with diethylene glycol and 0% with thiodiethylene glycol, i.e. 100% dead sperm cells in unfrozen semen. Muscovy

spermatozoa were sensitive to cryopreservation. The greatest damages were observed in the perforatorium, the midpiece and the mitochondrial helix.

DE: Muscovy ducks, semen, cryopreservation, cryoprotectant, morphological integrity

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 157–165.

TI: EVALUATION OF THE USEFULNESS OF THE HORSERADISH (*ARMORACIA RUSTICANA* GAERTN.) AS THE UNCONVENTIONAL ADDITIVE TO ENSI-LING OF GREEN FODDER FROM THE ALFALFA

AU: Grabowicz M., Sztark P., Dorszewski P., Mikołajczak J., Białecki K.

AD: Faculty of Animal Breeding and Biology, University of Technology and Life Sciences

LA: Polish

AB: The green fodder from alfalfa was harvested in initial stage of blooming and after prewilting it was ensiled in mikrosiloes (capacity about 8.5 l). The following variants of silages were prepared (n=4): without addition – control (K); with addition of microbiological preparation (M); with addition of different doses of dried horseradish root: 1, 5 and 10%. The powdered horseradish root was mixed with forage before filling mikrosiloes. Wilted green forage and silages samples and dried horseradish were determined for nutrient content including NDF, ADF, WSC according standard procedures (AOAC 1990, PN-R-64784:1994). Additionally, the buffer capacity was indicated in green forage (Weissbach 1992). In fresh silage parameters of the quality were indicated: pH, organic (lactic, acetic and butyric) acids and ammonia nitrogen (AOAC 1990).
The addition of horseradish improved the usefulness of the alfalfa to ensiling as demonstrated by a higher value of the fermentation coefficient in the comparison to green fodder without the addition. The value of this parameter increased significantly with increasing dose of horseradish. The dried horseradish rood influenced on the change of the chemical composition of green forage or silages. Depending on the dose of this preparation dry matter content as well as concentration of organic matter, N-free extract and WSC increased significantly, and a proportion of crude fibre, NDF and ADF in dry matter of fodders decreased in comparing to control sample and with inoculant. Addition of horseradish at ensiling of alfalfa improved fermentation profile of silages compared to the silages without additions and with microbiological preparation (higher milk acid content, lower acetic acid content).

DE: alfalfa, inoculant, horseradish, quality parameters of silages

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 167–175.

TI: THE ESTIMATION OF THE CHEMICAL COMPOSITION OF SILAGES FROM POTATOES STEAMED WITH ADDITION OF WHOLE AND KIBBLED BITTER LUPIN SEEDS

AU: Gulewicz P.[1], Mikołajczak J.[1], Górska A.[1], Nyske P.[1], Gulewicz K.[2]

AD: [1] Department of Animal Nutrition and Feed Management, University of Technology and Life Sciences, Bydgoszcz
[2] Laboratory of Phytochemistry, Institute of Bioorganic Chemistry PAS, Poznań

LA: Polish

AB: For a long time potatoes were a basic constituent in swine fattering. The changes in market expectations caused changes in the animal production and domination of swine races with high meat yield. This caused marginalization of the potato-fattering. However for native races of swine with lower meat yield and weight gain applying in the fattening the

appropriate amount of potatoes has a positive effect on a quality of the meat. Growing interest with the traditional fattening of pigs from the side of breeders induces the prospectings of new solutions in applying and the preservation of potatoes as fodder.
During fattering swine with raw potatoes one observes frequent poisonings likewise they are poorly digested. Freshly steamed potatoes are the best form of applying as fodder. Ensiliging of steamed potatoes is an alternative. The silaging of potatoes improves the tastiness and the bio-availability of nutrients. Moreover steamed and silaged potatoes enable supplying sufficient amount of fodder to pigs during all the year at slight losses in the storage. Labour incurred for preparing such fodder is smaller than in case of every steaming.
In a dry mass of potato tubers of starch varieties starch constitutes from 70 to 75% depending on the variety. Crude protein constitutes 9% and a half of it is the true protein. Such a content causes, that siliging of potatoes is a very effective method of preservation for the long period of time. The potatoes silage has a low nutritional value because of the low protein content. It is recommended to make combined silages, with the addition of green fodder from papilionaceae plants. Bitter lupin seeds can be also an addition enriching potato silages with protein. The high alkaloids content in seeds and their inattractive taste makes possible the cultivation of bitter lupin in the areas with high intensity of wild animals damages.
The main purpose of this work was determination of possibility of potatoes siliging with the addition of bitter lupin (*Lupinus angustifolius* cv. Mirela) seeds with 2,85% alkaloid content in the destination of increasing the protein content. Obtained silage of steamed potatoes with 15% addition of the lupin seeds had the higher crude protein content (3,56%) than the control silage (2,54%). Similarly silages with 7.5% and the 15% addition of kibbled seeds had the higher crude protein content (respectively 3,57 i 5,06%) than the control silage. However kibbled bitter lupin seeds addition negatively affected on the potato silage, since a content of the butyric acid increased in compare with control silage and silage with the addition of unkibbled lupin seeds.

DE: bitter lupin, silage, potatoes

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 177–188.

TI: THE EFFECT OF GLUTAMINE AND/OR GLUCOSE TO FEED CONTAINING SODIUM BUTYRATE ON PIGLETS PERFORMANCE AND THEIR AFTER-EFFECT OF STANDARD FATTENING RESULTS

AU: Hanczakowska E., Niwińska B., Węglarzy K.*

AD: Institute of Animal Production – National Research Institute in Balice

LA: Polish

AB: 12 litters of piglets descended from WBP sows mated with WBP boar were allocated to 4 groups 3 litters in each. Piglets were fed with mixture containing 0.3% of sodium butyrate MS (group I), MS and 1% of glutamine GL (II) or glucose GK (III). Group IV received all these supplements (MS+GL+GK). Piglets were weighed at birth, 35th, 56th and 84th days of life (end of the experiment on piglets). After weaning limited feeding was used.
After 84th day of life 20 piglets randomly chosen from each group were fed with standard Grower and Finisher mixtures. After 100 days fatteners were slaughtered. Mean backfat thickness and loin highness and broadness were estimated 24 hours later. pH, colour and water holding capacity of meat were estimated in *longissimus m.* samples.
No significant differences in piglets body mass at weaning were found though piglets from the MS+GL+GK group were heaviest. Such difference was significant ($P<0.05$) at 84th day. The mean body masses of piglets from particular groups were 29,9; 27.2; 27.6 and 32.0, respectively. During whole rearing period piglets from MS+GL+GK group had higher mean

body weight gains than these from GL and GK groups (P<0.05). Feed utilization in particular groups was proportional to body weight gains but differences were not significant. During the next 100 days of fattening there was no significant difference in body weight gains of fatteners receiving earlier particular supplements. Anyway in 184th day of life body mass of GL pigs was lowest and their body weight gains from birth to 184th day of life were significantly (P<0.01) lower than these from MS+GL+GK group. Pigs of MS+GK group had thicker backfat and meat of lower water holding capacity.

DE: sodium butyrate, glutamine, glucose, piglets, pigs

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 189–197.

TI: UTILIZATION OF BY-PRODUCT OF BIOFUEL PRODUCTION: RAPE PRESS CAKE AND GLYCEROL IN PIGLET FEEDING

AU: Hanczakowska E., Świątkiewicz M., Węglarzy K.

AD: Institute of Animal Production – National Research Institute in Balice

LA: Polish

AB: The experiment was performed on 240 piglets descending from WBP sows mated with WBP boar. From 7th day of life piglets were fed *ad libitum* with PP-prestarter mixture. After weaning in 35th day of life piglets were allocated to three groups 80 animals in each. Group I (control) received mixture containing soybean meal as main protein source. In the experimental groups soybean meal was replaced by rapeseed press cake in 3% (Group II) or 5% (Group III). In each group half of animals received supplement of 4% of refined glycerol. Glycerol was produced in BIELMAR Fat Manufacturing Plant in Bielsko-Biała. Feed and water were available *ad libitum.* Piglets were weighed at birth, weaning and at 56th and 84th days of life. Feed consumption was monitored.
There was no significant difference in piglets body mass at birth and weaning. Supplement of 5% of rapeseed press cake had negative effect on the final piglets body mass. At 84th day of life (end of the experiment) it was about 2.6 kg lower (P<0.01) than in both remaining groups. Mean body weight gains of piglets receiving 3% supplement of rapeseed press cake were similar to those of the control group. Raising the rapeseed press cake to 5% level significantly lowered piglets body weight gains and feed utilization (P<0.01). Glycerol also lowered piglets body weight gains and feed utilization.

DE: rape press cake, glycerol, piglet

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 199–206.

TI: EFFECT OF FEED SUPPLEMENTATION WITH SELENIUM AND VITAMIN E ON REPRODUCTIVE PARAMETERS AND HATCHIN EGGS QUALITY OF THREE- AND FOUR-YEAR-OLD WHITE KOLUDA GEESE®

AU: Jerysz A., Łukaszewicz E.

AD: Institute of Animal Breeding, Wrocław University of Environmental and Life Sciences

LA: Polish

AB: The aim of our study was to analyse the effect of feed supplementation with 0.3 mg/kg selenium (Sel-Plex ®, Alltech LTD, USA) and 100 mg/kg vitamin E (Rolimpex S.A) on reproductive performances and hatching eggs quality of three- and four-year-old White Koluda® geese. For each age group there were created the control group fed with the basic feed and experimental with feed supplemented with selenium and vitamin E (12 males and 54 females each). No effect of feed supplementation on laying rate and egg number of younger geese and hatching eggs characteristics in both age groups was stated. Positive

effect (P≤0.01) on egg number of four-year-old geese (51 vs. 45), but negative (P≤0.01) on egg fertility in both group (59 vs. 76% in three-year-old geese and 52 vs. 72%, in four-year flock). Moreover, feed supplements increased the goslings hatchability (lower embryo mortality and number of dead embryos however, existing differences were statistically not significant.

DE: White Koluda® geese, reproductive performances, hatching egg characteristics, selenium, vitamin E

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 207–221.

TI: QUANTITATIVE AND QUALITATIVE CHANGES IN DIETARY FIBRE OF RYE GRAIN EXPOSE TO INFRARED RADIATION AT DIFFERENT CONDITIONS OF PROCESS

AU: Kiczorowska B.

AD: Institute of Animal Nutrition and Bromatology, University of Live Science in Lublin

LA: Polish

AB: The effect of infrared radiation, at different time intervals (30, 40, 60 and 90 seconds) and in process temperatures (107, 127 and 147○C) of rye's grain (Dańkowskie Złote variety) on changes of dry matter, crude fiber content and dietary fiber composition: neutral detergent fiber (NDF), acid detergent fiber (ADF), cellulose (CEL), hemicellulose (HCEL) and lignin (ADL) was investigated.
Irrespectively of used parameters of process the infrared radiation had considerable influence on dietary fibre content and their composition. The significant lower content of NDF and HCL was stated in the rye's grain expose to infrared radiation at 60 and 90 s and in 127 and 147○C temperature compared to raw grain. The most stabile was the cellulose content.
In all the processing variants there was found a significantly higher ADL content in comparison with raw grain, (almost 3,5. times in rye's grain exposed to infrared radiation in 90 s).

DE: infrared radiation, dietary fiber, rye's grain

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 223–229.

TI: THE PRODUCTIVE EFFECTS OF LAMBS FED WITH CONCENTRATE MIXTURES CONTAINING DIFFERENT FEED PHOSPHATES

AU: Kinal S.[1] , Korniewicz D.[2], Korniewicz A.[1], Słupczyńska M.[1]

AD: [1] Department of Animal Nutrition and Feed Science, Wrocław University of Environ-mental and Life Sciences
[2] LNB Poland PLC, Kiszkowo

LA: Polish

AB: In experiments on lambs the estimation of dicalcium phosphate, produced according to new non-scrap and non-sewage, autothermal proecological technology, in comparison with monocalcium and calcium-sodium phosphates was conducted. The phosphates introduced to feed mixtures constituted 42% of lambs' requirement for phosphorus. The experiment was carried out on 48 lambs divided into three experimental groups fattening from 22 to 40 kg of live body weight. During the fattening period the individual live body weight gain and feed conversion were controlled. After reach of 40 kg of body weight from each of experimental group 8 animals (4♂ i 4♀) were chosen killed and carcass characteristic was conducted. Obtained data of experiment indicated that lambs fed with mixture containing dicalcium

phosphate had higher live body weight gain by 3,9% and feed utilization on 1 kg of live body weight gain was lower by 6,2 and 12,4% for lambs fed with mixtures containing monocalcium and calcium-sodium phosphates, respectively. The applied in lambs' feeding phosphates has no significant influence on slaughter efficiency – the weight of selected cuts as well as on leg tissue composition.

DE: phosphates, lambs, body weight gains, feed utilization, slaughter efficiency

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 231–242.

TI: EFFECT OF PROBIOTIC, PREBIOTIC AND SYMBIOTIC ON PERFORMANCES AND MEAT QUALITY OF BROILER CHICKEN FED DIETS BASED ON TWO KIND OF CEREALS (MAIZE/WHET, WHEAT/TRITCALE)

AU: Klocek B., Osek M., Milczarek A., Olkowski B., Janocha A.

AD: Department of Animal Nutrition, Faculty of Life Sciences, University of Natural Sciences and Humanities in Siedlce

LA: Polish

AB: This work evaluates the effects of supplementation with probiotic Calsporin(c), prebiotics Macrogard (m) and synbiotics (c+m) in maize/wheat or wheat/triticale based diets for broilers. A total of 256 broiler chicks (Ross 308) were divided into 8 groups, with dietary arrangement including basal diets as controls, and basal diets in combination with each supplement as treatments. Kind of cereal had significant impact on conversion of feed ($P<0.05$), and protein and energy ($P<0.01$) per 1 kg body weight gain in first fattening period. These indices was higher in groups fed Triticale based diets. There were no significant effects of supplements on production and post-slaughter parameters. The kind of grain in basal diet had significant ($P<0.01$) impact on taste intensity only in thigh muscles. Although there were positive tendency of supplements on the sensory attributes of meat, but significant ($P<0.05$) impact were note only case of on taste intensity of both breast and thigh muscles, and juiciness of thigh muscles. There was significant interaction ($P<0.05$) cereal x supplement on juiciness of thigh muscles.

DE: broiler, probiotic, prebiotic, synbiotic, cereal, meat quality

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 243–253.

TI: REPRODUCTIVE PERFORMANCE OF CROSSBRED SOWS

AU: Knecht D., Jankowska A., Środoń S., Żebrowski M.

AD: Institute of Animal Breeding, Department of Pig Breeding Wrocław, University of Environmental and Life Science

LA: Polish

AB: The aim of the research evaluate the parameters on piglets rearing on two hybrid lines Naima and Redone. The polish pork producers have to show good results in production and the quality of their product, if they want to have strong position in the meat market. To make such result it is necessary to supply meat factories with the material that is able to meet all European standards. This will provide a permanent receipt of pork. Also it is important to use breeding material of the highest quality. The crossing method decides about the percent of their realization. The aim of research was to define the level of raising from two hybrid lines Naima and Redone, also the dependence between the sequence of birth and results in raising piglets. The research started in October 2007 and ended in January 2009 and was made in one of the biggest farms specialized in mass piglet production. The object is situated in province of Opolskie. The examined objects were the piglets born from 160

sows. The piglets were examined for the percent of the increase from their birth to the 28 day of their life.

DE: crossbreed sows, piglets, reproductive indices

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 255–265.

TI: PRODUCTION RESULTS OF SOWS FED WITH MIXTURES OF LOWERED PROTEIN LEVEL AND AN ADDITION OF MULTICOMPONENT PRESERVA-TIVE

AU: Korniewicz D.[1], Gajewczyk P.[2], Dobrzański Z.[3], Korniewicz A.[4]

AD: [1] Cargill Animal Nutrition, Kiszkowo
[2] Department of Environment Hygiene and Animal Welfare, Wrocław University of Environmental and Life Sciences
[3] Institute of Animal Breeding, Wrocław University of Environmental and Life Sciences
[4] Department of Animal Nutrition and Feed Management, Wrocław University of Environmental and Life Sciences

LA: Polish

AB: The aim of the study was to determine the production results of pregnant and lactating sows fed with mixtures with lowered protein level and an addition of multicomponent preservative in amount of 0.8%. The study was conducted on 42 sows divided onto 3 feeding groups, 14 heads in each, and fed with complete mixtures of differentiated protein level with preservative addition. The level of protein and amino acids in the control group was compliant with Polish standards recommendations. The protein level in experimental groups was lowered of 10 and 20%, and the content of lysine, methionine, threonine and tryptophan was supplemented to the level of the control group. All pregnant and lactating sows were fed individually. The condition of pregnant and lactating sows was determined measuring the back fat thickness in P2 point at 30th and 105th day of pregnancy, and at 25th day of lactation. The number of piglets born, their body mass gains, colostrum and milk composition, and oestrus date after weaning and fertilisation efficiency were controlled. The highest gain of back fat thickness during pregnancy was noted in the group fed with mixtures of the lowest protein level, supplemented with highest amount of crystalline amino acids. The sows fed with mixtures of lowered protein level gave birth to smaller number of alive piglets of 0.7 and 0.5 heads. Body mass gains of piglets from birth until 21st day of life in experimental groups were similar like in the case of the control one. Lowered protein level with an addition of preservative to mixtures for late-pregnant and lactating sows did not influence the content of basic components of colostrum and milk. The period of becoming sterile and fertilisation efficiency were not dependent on protein level in mixtures applied.

DE: sows, feed mixture, preservative, performance

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 267–283.

TI: EFFECTOF FEED SUPPLEMENTATION WITH ORGANIC SELENIUM AND VITAMIN E ON FREEZABILITY OF JAPANESE QUAIL (*COTURNIX COTUR-NIX*) SEMEN

AU: Kowalczyk A., Jerysz A., Łukaszewicz E., Partyka A.

AD: Wrocław University of Environmental and Life Sciences, Institute of Animal Breeding, Division of Poultry Breeding

LA: English

AB: Positive effect of dietary selenium and vitamin E on avian semen quality has been documented in several experiments, therefore the aim of this paper was to examine if addition of these antioxidants to Japanese quail (*Coturnix coturnix*) diet can improve spermatozoa resistance to cryoinjury stress.
The experiment was carried out on 40, sexually matured Japanese quail males divided into two groups: control – fed, from the first day of life, with basic feeds and experimental group with feeds enriched by 0.3 mg/kg selenium (Sel-Plex®, Alltech LTD) and 100 mg/kg vitamin E (E-50 Adsorbate, Rolimpex S.A).
Semen was collected using male stimulation by the female procedure, three times a week. In the fresh semen pooled ejaculate volume and spermatozoa concentration were evaluated, while in the fresh, equilibrated with 6% DMA and frozen-thawed semen, the spermatozoa morphology (in nigrosin-eosin cytological smears) and MDA concentration (as an indicator of lipid peroxidation) were calculated.
None significant effect of feed supplementation with selenium and vitamin E on all traits evaluated in the fresh, equilibrated and frozen-thawed semen was observed. However, in the frozen-thawed semen slightly higher number of live and morphologically normal cells and lower lipid peroxidation level was stated, what can suggest the positive effect of antioxidants addition on quail spermatozoa resistance to cryoinjury stress.

DE: quails, organic selenium, cryopreservation, spermatozoa morphology, malondial-dehyde

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 285–296.

TI: CONTAMINATION OF FEED MIXTURES WITH MYCOTOXINS IN SOUTH-WESTERN AND WESTERN REGION OF POLAND

AU: Kubizna J., Jamroz D., Kubizna J., Koźlik K.

AD: Department of Animal Nutrition and Feed Quality, Wrocław University of Environmental and Life Sciences

LA: English

AB: The studies on the contamination of feed mixtures with mycotoxins (aflatoxins, ochratoxins, zearalenone) were carried out on the basis of data collected from the Regional Laboratories for Veterinary Hygiene in Poznań, Wrocław and Opole and were related to the years 2003–2007. Overall, 1 642 samples were examined. In the majority of cases the predominant mycotoxin was ochratoxin then zearalenone.

DE: mycotoxins, feed mixtures, contamination

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 297–307.

TI: INFLUENCE OF TEMPERATURE AND BLOOD SERUM STORAGE TIME ON THE CONTENT OF β-HYDROXYBUTYRATEACID

AU: Kupczyński R., Burek A., Pogoda-Sewerniak K., Orszulak P.

AD: Department of Environmental Hygiene and Animal Welfare, Wrocław University of Environmental and Life Science

LA: Polish

AB: The aim of the study was to determine the influence of temperature and material storage time on the concentration of β-hydroxybutyrate acid (β-HM) in blood serum of cows. The study was conducted on 12 cows and the content of serum β-HM was measured in 240 samples. The analyses were performed 4 hours since collection, and then at 1st, 2nd, 3rd and 7th day, and after 3 and 6 months since blood collection with various storage temperatures of samples (21ºC, 4–8ºC, -20ºC, -70ºC). β-hydroxybutyrate acid content was determined in

blood serum using the method based on an oxidation of D-3-hydrxybutyrate to acetoacetic acid in the presence of 3-hydrxybutyrate dehydrogenase using a biochemical analyzer Pentra 400 (HORIBA ABX Diagnostics, France). Concentration of β-HM in blood serum stored in room temperature is stable up to 72 hours since collection, while the concentration in blood serum stored in a temperature of 4–8ºC, -20ºC is stable for 7 days. The stability of β-HM concentration during deep freezing (-70ºC) is maintained only up to 72 hours since freezing. The storage of serum in a temperature of -20ºC and -70ºC for a longer period of time, i.e. 3 and 6 months, caused significant ($P \leq 0.01$) changes in that parameter concentration.

DE: cows, β-hydroxybutyrate, glucose, rapid test, glucometer

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 309–315.

TI: THE EFFECT OF ADDING COPPER GLYCINE CHELATE ON FATTY ACID PROFILE IN CHICKENS' BREAST MUSCLE

AU: Kwiecień M., Winiarska-Mieczan A.

AD: Institute of Animal Nutrition and Bromatology, University of Life Sciences in Lublin

LA: Polish

AB: The study set out to determine the effect of feed mixtures enriched with copper glycine chelate on production effects, selected parameters of slaughter analysis and the content and profile of fatty acids in the breast muscles of broiler chickens.
The obtained results suggest that a copper supplement in the form of chelate reduced the content of fat at every level by ca. 30%, compared to the control group. The addition of copper in the form of chelate resulted in a significant decrease ($P \leq 0,01$) in the content of polyunsaturated fatty acids PUFAn-3 in roosters' breast muscle, compared to the control group. On the other hand, the total content of saturated fatty acids (SFA) significantly increased in the group administered the chelate at the level of 8mg (30.01%) in comparison with the control (28.47%). Additionally, a positive influence of copper glycine chelate was recorded, regarding production effects and selected slaughter parameters. The addition of copper glycine chelate resulted in a significant ($P \leq 0.01$) increase in the final body weight of the roosters (by ca. 12% on the average) and a reduction ($P \leq 0.05$) of feed intake per 1 kg of weight gain. No falls were observed in the group of chickens fed the chelate at the level of 8 mg.

DE: broilers, Cu-glycine, fatty acids, breast meat

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 317–326.

TI: NUTRITIONALAND ENERGY VALUE OF DIFFERENT WHEAT CULTIVARS FOR GEESE

AU: Lasek O., Barteczko J., Borowiec F.

AD: Department of Animal Nutrition and Feed Management, University of Agriculture in Kraków

LA: Polish

AB: The aim of the study was to determine nutrient and energy value of different wheat cultivars (Torka, Muza, Rysa, Bryza, Zebra, Vinjett) for geese (sp. Zatorska). In vivo digestibility was measured by a standard method on thirty geese (6 groups of 5 birds). In grains were analyzed basic nutrients, dietary fibre (SDF, IDF), ADL, ADF, NDF, starch and sugars and also gross energy. During digestibility trial nitrogen balance (BN), digestible energy (DE) apparent metabolizable energy (AME) and apparent metabolizable energy corrected to zero nitrogen balance (AMEN) were measured.

AB: The content of crude protein (123.1–154.6 g·kg^{-1} DM), ether extract (13.8–22.2 g·kg^{-1} DM), starch (600.7–747.5 g·kg^{-1} DM), ADL (0.1–4.4 v DM), ADF (33.5–42.6 g·kg^{-1} DM), NDF (105.3–126.2 g·kg^{-1} DM), IDF (106.2–116.8 g·kg^{-1} DM), SDF (14.4–37.4 g·kg^{-1} DM) and also GE (18.37–18.64 MJ·kg^{-1} DM) were different among cultivars. Differences in content of nutrient between cultivars influenced on digestibility coefficient and energy utilization. Digestibility of dry matter (73.79–82.88%), organic matter (76.03–84.35%), ether extract (64.04–78.37%) were different ($P<0.05$). Crude protein digestibility were similar 72.10–79.40%) ($P>0.05$). AME_N content were different and standard error between cultivars was ±0,47 MJ ($P>0.05$). Coefficient of energy utilization came to: DE/GE (78.80–84.48%) and AME_N/GE (75.29–81.32%) ($P>0.05$).
In conclusion, cultivars of wheat important influenced on nutritional and energy value and nutrient digestibility. In mixture formulation for goose it is recommended to take into a consideration the differences in chemical composition and nutrients digestibility between wheat grain cultivars.

DE: geese, wheat cultivars, digestibility, AME_N

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 327–336.

TI: THE ANALYSIS OF A DEPENDENCE BETWEEN POSTPARTUM EVALUA-TION OF A FOALAND ITS GROWTH, DEVELOPMENT AND LATER RACING VALUE

AU: Maliszewska M., Kruszyński W.

AD: Departament of Genetics and Animal Breeding,Wrocław University of Evironmental and Life Science

LA: Polish

AB: The researches were conducted on 77 Thoroughbred horses, which were born in SK Golejewko since 1999 to 2003. For every individual possessing (birth register) data concerning the postpartum evaluation of foals and their growth up to nine month old was collected.
Postpartum evaluation (in five stages scale) was conducted in first hours of foal's life. The analysis of foal's growth and development contained: daily weight gain up to six month, changes of linear dimensions, bonyness index and foals' massiveness index up to nine month. Parameters were established for every foal in phases of growth and development from birth up to nine month.
In the analysis of the racing value in one season, was used individual coefficient of success and mean prize for one start. Statistic analysis were conducted using linear model (GLM), and applied to relations between postpartum evaluation and its components and every features concerning growth, development and racing value. The phenotype correlations were estimated between analysis features using Nested procedure.
The analysis of dependence among the foal's postpartum evaluation and its later growth and the development, shows on the row occurrence of dependence among elements of evaluation and the growth – development parameters. The analysis of dependence among parameters of after-birth opinion and the coefficients of racing usefulness were mostly low and negative.

DE: horse, growth and development, Thoroughbred, racing value

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 337–351.

TI: THE EFFECTIVENESS OF REARING CALVES RECEIVING GLUTAMINE AND GLUCOSE ADDED TO THE FEED CONTAINING SODIUM BUTYRATE

AU: Niwińska B.[1], Hanczakowska E.[1], Węglarzy K.[2]

AD: [1] Department of Animal Nutrition and Feed Science, National Research Institute of Animal Production
[2] Experimental Station of National Research Institute of Animal Production in Grodziec Śląski

LA: Polish

AB: The aim of this study was to analyze the effects of the introduction of glutamine, glucose or both of these substances in milk replacers and concentrate mixture containing sodium butyrate on the effectiveness of rearing calves from 7 to 56 days of age (feeding liquid period) and from 57 to 90 days of life (feeding solid feed). *Polish Holstein-Friesian* female calves were fed iso-energetic and iso-protein milk replacer and concentrate mixture containing sodium butyrate (3 $g \cdot kg^{-1}$ dry matter, DM). Control group (Na-B) received basic diet, group GT basic diet supplemented with 10 $g \cdot kg^{-1}$ DM of glutamine, group GK with 10 $g \cdot kg^{-1}$ DM of glucose, and group GT+GK with glutamine and glucose (each 10 $g \cdot kg^{-1}$ DM). Nutritive value of diets and nutrition program were used in accordance with the standards (IZ PIB-INRA 2009).
The introduction of both glutamine and glucose in the diets, increased daily body weight gain (BWG) of calves during the period of liquid feed feeding (by 35 g) and during all experiment (by 33 g), as compared to those characterized calves receiving diet without supplements ($P \leq 0.05$). The similar ($P > 0.05$), as in the other groups, daily BWG characterized calves fed diets only with glutamine or glucose. During period of liquid feed feeding calves receiving diets with both glutamine and glucose used less of milk replacer solution (by 0.87 kg), dry matter (by 0.14 kg), crude protein (by 20.7 g), protein digested in intestine (by 20 g) and UFL (by 0.19 unit) to obtain kg of BWG ($P \leq 0.05$), comparing with the corresponding values characterized animals from other groups. The obtained results indicate, that in calves, the introduction of 10 g glutamine and 10 g glucose in kg of dry matter of feeds containing 3 g of sodium butyrate improves growth performance during rearing period.

DE: calves, sodium butyrate, glutamine, glucose, rearing efficiency

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 353–364.

TI: EFFECT OF COMPLEX PROBIOTIC AND HERB SUPPLEMENT FOR SOWS IN THE LAST PERIOD OF PREGNANCY AND DURING LACTATION ON PIGLETS REARING PERFORMANCE

AU: Pieszka M., Bederska D., Janik A.

AD: Department of Animal Nutrition and Feed Science, National Research Institute of Animal Production, Balice

LA: Polish

AB: The aim of the study was to estimate the effect of probiotic BioPlus 2B (*Bacillus licheniformis, Bacillus subtilis*) and herb concentrate Fresta F supplements to sows diet during the period from 80 days of pregnancy to piglets weaning in 26 days of life on piglets rearing performance. It was stated that supplements used in the study had an profitable effect on piglets body gains and of feed conversion during rearing with the sow to weaning time. Mentioned feed supplements positively affected the health status of piglets limiting the mortality. Moreover higher activity of liver enzymes ALT and AST, which are indicators of organism growth rate in piglets getting supplement of probiotic and herbs was observed.

DE: probiotic, herb, sows, piglets

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 365–374.

TI: CHANGES IN THE AMINO ACIDCOMPOSITION OF RED CLOVER PROTEIN DURING ENSILAGING

AU: Purwin C., Pysera B., Lipiński K., Antoszkiewicz A.

AD: Departament of Animal Nutrition and Feed Managament, University of Warmia and Mazury in Olsztyn

LA: Polish

AB: The aim of the research was to compare the amino acid composition of the protein in green matters and silages of different varieties of red clover. The plant material was green matter from red clover of diploid (Krynia, Parada) and tetraploid varieties (Bona, Jubilatka). The green matter was harvested in the initial phase of flowering and after 24 hours of drying it was ensilaged in microsiloses. After 90 days of storing silages samples were taken for chemical analysis. The process of ensilaging evidently lowered the content of dispensable amino acids from 7.1 to 13.3%, whereas the changes in the content of indispensable amino acids were varied. The comparison of amino acid composition of the protein in ensilaged green matters revealed a lowered content of arginine (29.3–55.7%), histidine (4.8–11.3%), lysine (4.8–13.2%) and leucine (0.3–10.0%) in all silages. Moreover, a higher content of valine (12.6–69.6%), methionine (3.9–24.0%), threonine (0.5–11.7%), isoleucine (2.1–17.1%) and phenylalanine (1.1–21.2%) were observed. The level of tryptophan was higher only while ensilaging the green matter of Bona variety (8.9%) while in other green matters its content was significantly lower (8.3–19.2%). The process of ensilaging lowered the value of red clover as the source of lysine and histidine, but it had a positive impact on the level of methionine. The genetic form (ploidy) of red clover had an insignificant impact on the range of changes in the amino acid content of protein during ensilaging, though bigger changes occured in tetraploid varieties. Also, a greater variety in the changes of amino acid content during ensilaging was observed for tetraploid varieties (Bona and Jubilatka).

DE: red clover, amino acids, ensilaging, diploid, tetraploid

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 375–381.

TI: A COMPARISON OF THE EFFICACY OF DRIED AND ENSILED MAIZE GRAIN IN PIG NUTRITION

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AB: The aim of this study was to compare the efficacy of dried and ensiled maize grain in pig nutrition, and to evaluate the effectiveness of ensiled grain processing prior to administration.

Experimental diets were fed to 24 growing-finishing pigs (Polish Large White x Polish Landrace). The efficacy of the diets was estimated based on nutrient digestibility, nitrogen balance, the growth performance of pigs and feed conversion. The grinding degree of dried and ensiled maize grain, the proximate chemical composition and quality of silage and selected parameters of the fermentation process were determined. Feces samples were assayed for proximate chemical composition, the levels of fatty acids and biogenic amines. Ensiled maize grain was characterized by high concentrations of total protein (86.9 g/kg d.m.) and fatty acids (70.30 g/kg d.m.) whose amounts increased considerably in silage subjected to fermentation prior to administration (92.08 g/kg d.m.).

Nutrient digestibility was significantly higher in diets containing ensiled maize grain than in the diet with dried maize grain.

The most favorable nitrogen balance was noted in pigs fed crushed ensiled maize grain, which were marked by higher utilization of nitrogen taken up (60.5 vs. 49.0%, $P < 0.05$) and digested (72.0 vs. 61.7%, $P<0.01$) in comparison with control group animals. The concentrations of fatty acids in feces were insignificantly lower in pigs fed dried maize grain (118.56 μmol/g) and liquid maize silage (102.16 μmol/g), compared with animals receiving crushed and ground ensiled maize grain (139.07 and 138.02 μmol/g, respectively). Feces samples collected from pigs fed dried maize grain had the highest content of biogenic amines (8.38 μmol/g), while considerably lower and similar values were reported in the feces of animals fed ensiled maize grain (2.95, 3.53 and 2.86 mg/kg d.m.).
The body weight gains of pigs fed ensiled maize grain reached 1046–1057 g, and they were by over 100 g higher than those noted in animals receiving ground maize.

DE: maize, preservation, growing-finishing pigs, digestibility, nitrogen balance, fattening.

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 383–392.

TI: INFLUENCE OF HULLESS OAT IN DIET OF GROWING-FINISHING PIGS ON PERFORMANCE, NUTRITIONAL VALUE OF MEAT AND BLOOD BIOCHEMI-CAL INDICES

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AB: The aim of the study was to evaluate the influence of differentiated share of hulless oat (*Avena nuda* L.) in growing–finishing pigs' diets on production effects and selected blood biochemical indices, as well as on content of nutrients, cholesterol and fatty acid profile in ham.
The experiment was conducted on 60 pigs of (PL × PLW) × Pietrain crossbreed, divided into 5 feeding groups by analogues. Animals of group I were fed standard mixtures of PT-1 and PT-2 types. In mixtures for groups II, III, IV and V were introduced different amounts of naked oat (25, 50, 75 and 100% of cereal share, respectively).
Application of naked oat in diets' for growing–finishing pigs contributed to good production results. The best average daily gains and feed utilization were observed in group with 50% share of hulless oat in mixture. Introduction of naked oat to the mixtures didn't influence backfat thickness or weight of leaf fat, whereas increased share of saturated fatty acids in ham was noted.

DE: hulless oat, growing-finishing pigs, production effects, blood biochemical indices, nutritional value of ham

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 393–401.

TI: ANEVALUATION OF THE SUITABILITY OF GOAT'S RUE (*GALEGA ORIEN-TALIS* LAM.) SILAGE AS A COMPONENT OF DAIRY COWS DIETS BASED ON COW MILK YIELD AND THE PHYSICOCHEMICAL PROPERTIES OF MILK

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AB: The aim of this study was to determine the effect of various inclusion levels of wilted galega (*Galega orientalis* Lam.) silage in dairy cattle diets based on cow performance and the nutritive value of silage.

The experiment was performed on 30 primiparous cows (Black-and-White × HF, ±125 kg BW 0.75) consisted of 10 animals in each grups kept under production conditions.
Galega silage (first cut, beginning of flowering, 37.2% DM) was made with the use of Kemisile 2000) added in the amount of 4 dcm^3 t^{-1} green forage.
Diet composition was as follows: maize silage (31.3% DM) – 24 kg in all treatments, wilted grass silage (29.4% DM) and soybean meal – 1 kg in all treatments. In experimental groups, wilted grass silage (18 kg in the control diet) was partially (7.2 kg) or entirely (14.4 kg) replaced with galega silage.
An assessment of the chemical properties of goat's rue silage confirmed its very good quality – the silage scored 96 – 98 on the Flieg-Zimmer scale. The obtained results show that different levels of wilted galega silage (21% and 42% DM of roughage, respectively) had no significant effect on cow productivity and physicochemical properties of milk. A desirable increase ($P \leq 0.05$ and $P \leq 0.01$) in the urea content of milk was noted in experimental groups.

DE: *Galega orientalis* Lam., silage, cows performance

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 403–411.

TI: THE INFLUENCE OF ENERGY-YEAST PRODUCT ON THE RATE OF GROWTH AND FLESHINESS OF FATTENERS

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LA: Polish

AB: Loose energy-yeast product was produced on dry brewer's yeast which are mixed with definite components of the monosaccharide and polysaccharide (13,9 MJ EM; 35,49% crude protein; 20,3% sugar; pH 4,06). The product has stable property values of chemical composition. The experimental mixture for fatteners contained 4% of energy-yeast product. During fattening the rate of growth, feed intake, health condition of animals and their fleshiness were controlled. The group which received experimental product was juxtaposed with negative control in which standard mixture without additive was used and second group which received the same mixture but with an additive of 2% of brewer's yeast *Saccharomyces cerevisiae*. The obtained results show that the addition of the energy-yeast product improving feed intake (because of sweet-sour taste of feed). This result supports the higher body gain, better feed utilization and higher fleshiness (1,61%). The higher level of albumin and the lower concentration of urea in blood serum were noted in groups of animals receiving energy-yeast product in feed. Such results support good nutrition of the fatteners and better administration of nitrogen in that groups.

DE: fatteners, energy-yeast product, feed intake, rate of growth, fleshiness

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 413–424.

TI: THE INFLUENCE OF FIELD BEAN VEGETATION PHASE ON QUALITY, AEROBIC STABILITY AND NUTRITIONAL VALUE OF SILAGE

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LA: Polish

AB: Investigations were carried out on the vegetal (plant) material obtained from the experimental field. Field bean plants (*Vicia faba* var. Nadwiślański) were harvested in three vegetation phases – flat-pod, pods reached final size and the phase of the dry seeds. Chopped green matter of each harvest time was ensiled in the gas-proof tubes of 1.5 liters capacity.

Statistical analysis proved the significant ($P<0.01$) differences between content of dry matter in silages of first and second harvest time and third silage. The highest crude protein concentration (18.39 %) in the silage made from plants harvested in the flat pod phase was stated. In both remaining silages the content of crude protein accounted to the dry matter, was similar and amounted 16.31 and 16.08%, respectively and differed significantly ($P<0.05$) in comparison with first silage. The lowest concentration of crude fibre (24.74 %) in the silage made from the material harvested in the flat-pod phase was stated and significantly differed from both remaining silages ($P<0.05$). The concentration of other nutrients in all examined silages was on the similar level. The delay of harvest data involved decreasing of energy value (UFL and UFV) as well as protein value (PDIN and PDIE) of silages.

Silages made in the 1st and 2nd phase of vegetation contained considerable amounts of butyric acid in total VEA. In third silage only traces of this acid were stated. Despite of highest score, according to Flieg-Zimmer scale, this silage was characterized by the shortest aerobic stability.

DE: silages, field bean, vegetation phase, quality, aerobic stability, nutritional value

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 425–432.

TI: THE EFFICIENCY O FDISTILLERS DRIED GRAINS WITH SOLUBLES (DDGS) IN FEEDING OF SOWS, PIGLETS AND WEANERS

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AB: The aim of the experiment was to estimate the effect of corn (DDGS-K) or wheat (DDGS-P) distillers dried grains with solubles, used in feed mixture with or without the fodder enzymes (E) supplementation, on the sows reproductive parameters and piglets performance.

The experiment was carried out on 30 sows (PL x WLP) mated with Duroc x Pietrain boar. After mating sows were divided into one of the 5 groups. All sows obtained restricted amounts of feed mixtures containing similar level of energy and lysine, according to the swine nutritional requirements (Normy… 1993). Sows in the control group I received the standard feed mixtures, without any DDGS and enzymes additives. The feed mixtures for the experimental sows contained DDGS-K (group II, III) or DDGS-P (group IV, V) and characterized in presence (group III, V) or absence (group II, IV) of fodder enzymes. The scheme of experiment carried out on piglets was similar to that above.

Summing up the obtained results it can be stated that corn and wheat distillers dried grains with solubles (DDGS) used in feed mixtures for sows and piglets did not negatively affect the sows reproductive results as well as the piglets rearing indices. The addition of enzymes preparation to piglets' feed mixtures containing DDGS positively influenced the body weight gains and decreased the amount of feed used per 1 kg of body weight gain.

DE: sow nutrition, piglet nutrition, DDGS, fodder enzymem

SO: Zesz. Nauk. UP Wroc., Biol. Hod. Zwierz., 2011, LXII, 580: 433–442.