ISBN 978-86-82431-69-5

10th International Symposium

MODERN TRENDS IN LIVESTOCK PRODUCTION

PROCEEDINGS

Belgrade, Serbia, 2 - 4 October, 2013

www.istocar.bg.ac.rs

INSTITUTE FOR ANIMAL HUSBANDRY
BELGRADE - SERBIA

10th INTERNATIONAL SYMPOSIUM
MODERN TRENDS IN LIVESTOCK PRODUCTION
PROCEEDINGS

Belgrade, Serbia, 2 - 4 October, 2013
www.istocar.bg.ac.rs

ISBN 978-86-82431-69-5
Number of copies / 250 electronic copies

PATRON

Ministry of Education, Science and Technological
Development of the Republic of Serbia

ORGANIZER

Institute for Animal Husbandry
Autoput 16, P. Box. 23, 11080, Belgrade-Zemun, Serbia
Tel: +381 11 2691 611;
+381 11 2670 121;
+381 11 2670 541;
Fax: + 381 11 2670 164;
biotechnology.izs@gmail.com
www.istocar.bg.ac.rs

EDITOR INSTITUTE FOR ANIMAL HUSBANDRY

For Editor Miloš Lukić, Ph.D.
Editor in Chief Zlatica Pavlovski, Ph.D.

INTERNATIONAL SCIENTIFIC COMMITTEE

CHAIRMAN	Prof. Dr. Martin Wähner, Germany
SECRETARY	Dr. Zlatica Pavlovski, Serbia
MEMBERS	Dr. Miloš Lukić, Serbia
	Dr. Stevica Aleksić, Serbia
	Prof. Dr. Mohamed Kenawi, Egypt
	Dr. Miroslav Žujović, Serbia
	Prof. Dr. Wladyslaw Migdal, Poland
	Prof. Dr. Vigilijus Jukna, Lithuania
	Dr. Milan M. Petrović, Serbia
	Dr. Milan P. Petrović, Serbia
	Prof. Dr. Giacomo Biagi, Italy
	Prof. Dr. Zoran Luković, Croatia
	Prof. Dr. Pero Mijić, Croatia
	Prof. Dr. Kazutaka Umetsu, Japan
	Dr. Branislav Živković, Serbia
	Dr. Zorica Tomić, Serbia
	Assoc. Prof. Dr. Gregor Gorjanc, Slovenia
	Prof. Dr. Milica Petrović, Serbia
	Prof. Dr. Elena Kistanova, Bulgaria
	Assoc. Prof. Dr. Maia Ignatova, Bulgaria
	Dr. Ivan Bahelka, Slovakia
	Prof. Dr. Dragan Glamočić, Serbia
	Prof. Dr. Vlado Teodorović, Serbia
	Prof. Dr. Liu Di, China
	Prof. Dr. Goce Cilev, Macedonia
	Prof. Dr. Božidarka Marković, Montenengro
	Prof. Dr. Christina Ligda, Greece
	Dr. Hendronoto Lengkey, Indonesia
	Dr. Aleksandr I. Erokhin, Russia

ORGANIZING COMMITTEE

CHAIRMAN	Dr. Miloš Lukić
SECRETARY	Dr. Vesna S. Krnjaja
MEMBERS	Dr. Zdenka Škrbić
	Dr. Dragana Ružić-Muslić
	Dr. Vlada Pantelić
	Dr. Čedomir Radović
	Dr. Zorica Bijelić
	Dr. Violeta Mandić
	Dr. Branka Vidić
	Prof. Dr. Dušan Živković
	Prof. Dr. Slavča Hristov
	Prof. Dr. Dragan Šefer
	Prof. Dr. Vladan Bogdanović
	Prof. Dr. Dragan Žikić
	Prof. Dr. Ljiljana Janković
	Prof. Dr. Milun D. Petrović
	Prof. Dr. Zoran Ilić
	Doc. Dr. Predrag Perišić
	Doc. Dr. Aleksandar Simić
	Dr. Slobodan Lilić
	Dr. Dejan Sokolović

SYMPOSIUM SECRETARIAT

CHAIRMAN	Vesna S. Krnjaja
MEMBERS	Čedomir Radović
	Zorica Bijelić
	Olga Devečerski
	Stanislav Marinkov
	Slavko Maletić
	Dušica Ostojić-Andrić
	Nikola Stanišić
	Nevena Maksimović
	Dragan Nikšić
	Veselin Petričević
	Marija Gogić
	Marina Lazarević
	Maja Petričević
	Violeta Mandić

CONTENTS

INVITED PAPERS

M. Lukić, Z. Pavlovski, Z. Škrbić, K. Umetsu, V. Petričević
THE PRESENT AND FUTURE LIVESTOCK PRODUCTION – CASE STUDY SERBIA (Serbia)……. 1-14

V. Jukna, Č. Jukna, E. Meškinytė-Kaušilienė
GENETIC DIVERSITY OF BREED OF BEEF CATTLE POPULATION CONCERNING MEAT PRODUCTION AND QUALITY(Lithuania)……. 15-25

V. Pantelić, D. Ružić-Muslić, M.M. Petrović, D. Nikšić, D. Ostojić-Andrić, S. Aleksić, M. Lazarević
THE PHENOTYPIC VARIABILITY OF PRODUCTION TRAITS IN THE POPULATION OF SIMMENTAL COWS (Serbia)..... 26-36

P. Mijić
MICROCLIMATE PARAMETERS ON THE CATTLE FARMS AND SOME TECHNOLOGICAL SOLUTIONS FOR ELIMINATION OF THEIR HARMFUL INFLUENCE (Croatia)……..... 37-47

M.D. Petrović, M.M. Petrović, V. Bogdanović, S. Bogosavljević-Bošković, R. Đedović, S. Rakonjac
EFFECT OF FIXED AND CONTINUOUS NON-GENETIC FACTORS ON LENGTH OF SERVICE PERIOD IN SIMMENTAL COWS (Serbia)…….....…… 48-56

Z. Ilić, R. Djoković , V. Kurćubić, M.P. Petrović, V. Caro-Petrović, J. Stojković, B. Milošević, Z. Spasić, S. Ćirić, B. Ristanović
EVALUATION THE METABOLIC STATUS OF EARLY AND MID LACTATION DAIRY COWS THROUGH CHANGES IN BLOOD BIOCHEMICAL INDICATORS (Serbia)…….....…… 57-65

D. Ostojić-Andrić, S. Hristov, M.M. Petrović, V. Pantelić, S. Aleksić, D. Nikšić, M. Dokmanović
WELFARE INDICATORS OF DAIRY COWS - SELECTION AND IMPLEMENTATION IN ASSESSMENT (Serbia)……....…….. 66-79

S. Hristov, B. Stanković, N. Maksimović D. Ostojić-Andrić, Z. Zlatanović,
THE DAIRY FARM RISK ASSESSMENT AND DEVELOPMENT OF BIOSECURITY PLAN (Serbia)……..... 80-91

I. Bahelka, M. Gondeková
A SURVEY OF BEEF CARCASS AND QUALITY TRAITS IN SLOVAKIA (Slovakia)……..... 92-101

W. Migdał, B. Živković, J. Tkaczewska, P. Kulawik, A. Migdał, Ł. Migdał
CULINARY VALUES OF BEEF MEAT (Poland)..... 102-112

M. Iwasaki, M. Lukic, T. Yamashiro, M. Gogic, C. Radovic, F.J. Andriamanohiarisoamanana, K. Umetsu
EFFECT OF METHANE FERMENTATION ON SURVIVAL OF ANTIBIOTICS-RESISTANT BACTERIA IN DAIRY COW MANURE (Japan)…… 113-118

B. Vidić, S. Savić, S. Boboš, V. Vidić, N. Prica
NEOSPORA CANINUM IN CATTLE: EPIZOOTIOLOGY, DIAGNOSTICS AND CONTROL MEASURES (Serbia)…..... 119-128

Z. Luković, D. Radojković
DISPERSION PARAMETERS FOR LITTER SIZE IN PIGS (Croatia) 129-139

M. Wähner, J. Kauffold
EFFECTS OF FEEDING ON REPRODUCTION IN PIGS (Germany). 140-154

Liu Di
CHARACTERISTICS, STUDIES AND UTILIZATIONS OF CHINESE LOCAL SWINES (China)……..... 155-162

Č. Radović, M. Petrović, B. Živković, D. Radojković, N. Parunović, R. Savić, M. Gogić
PORK PRODUCTION AND EVALUATION OF MEAT YIELD IN SERBIA AND THE WORLD (Serbia)……..... 163-173

G. Cilev
EXAMINING THE EFFICIENCY OF THE PARTIAL SUBSTITUTION OF THE MAIZE WITH A BY-PRODUCTS OBTAINED BY MANUFACTURING VEGETABLES AND FRUITS IN MIXTURES FOR WEANED PIGLETS (Macedonia)…….. 174-187

D. Živković, S. Stajić, N. Stanišić
POSSIBILITIES FOR THE PRODUCTION OF MEAT AND MEAT PRODUCTS WITH IMPROVED NUTRITIONAL AND FUNCTIONAL VALUE (Serbia)……..…… 188-199

N. Stanišić, D. Živković, M. Petrović, N. Delić, G. Marinkov, Lj. Stojanović
CONJUGATED LINOLEIC ACID IN PIG NUTRITION: EFFECTS ON FATTENING PERFORMANCE AND CARCASS COMPOSITION (Serbia)..... 200-211

G. Biagi, C. Pinna
THE UTILIZATION OF PROBIOTIC BACTERIAL STRAINS FOR MONOGASTRIC ANIMALS WITHIN THE EUROPEAN UNION (Italy) …..... 212-221

Z. Škrbić, Z. Pavlovski, M. Lukić, V. Petričević, D. Milić, G. Marinkov, Lj. Stojanović
THE ROLE OF LIGHT IN BROILER PRODUCTION *(*Serbia)…..…. 222-231

D. Žikić, G. Uščebrka, S. Stojanović, Z. Kanački
ALTERNATIVE GROWTH PROMOTERS AND BROILER'S INTESTINAL MORPHOLOGY AND FUNCTION (Serbia)…..…….. 232-243

D. Šefer, S. Radulović, R. Marković, D. Jakić-Dimić, D. Milić
BIOTECHNOLOGICAL SOLUTIONS FOR THE GROWTH STIMULATION OF BROILERS (Serbia)…...…… 244-260

S. Lilić, S. Dimitrijević, T. Ilić
IMPORTANCE OF COCCIDIOSIS IN POULTRY PRODUCTION (Serbia)..... 261-278

M. Kenawi, M.P. Petrovic, V. Caro-Petrović
EFFECT OF EDIBLE COATING AND STORAGE TEMPERATURE ON THE QUALITY OF TABLE EGGS (Egypt)…… 279-287

D. Abadjieva, M. Chervenkov, K. Shumkov, A. Shimkus, A. Shimkiene, E. Kistanova
IMPROVING OF PRODUCTIVE AND REPRODUCTIVE PERFORMANCES IN RABBITS BY BIOLOGICALLY ACTIVE FEED ADDITIVES (Bulgaria)……. 288-298

M. Savić, S. Aleksić, D. Živković
BREEDS OF CHOICE IN ORGANIC PRODUCTION SYSTEM (Serbia)..... 299-306

A.I. Erokhin, E.A. Karasev, I.N. Sycheva
STATE AND PERSPECTIVES OF SHEEP BREEDING DEVELOPMENT IN RUSSIA (Russia)…..... 307-313

Ch. Ligda, E. Sossidou, I. Tzouramani
DOMESTIC PROJECT: CHALLENGES AND STRATEGIES FOR THE SUSTAINABLE DEVELOPMENT OF THE PASTORAL AND RANGELAND SHEEP AND GOAT PRODUCTION SYSTEMS IN EPIRUS (IPEIROS) REGION IN GREECE (Greece)……..... 314-324

B. Marković, Z. Antunović, J. Novoselec, M. Marković, Ž. Klir
COMPARISON OF THE EXTERIOR CHARACTERISTICS OF THE ENDANGERED SHEEP BREEDS IN MONTENEGRO AND REPUBLIC OF CROATIA (Montenegro)…….. 325-332

D. Ružić-Muslić, M.P. Petrović, M.M. Petrović, Z. Bijelić, V. Caro-Petrović, V. Pantelić, P. Perišić
OPTIMIZATION OF ENERGY AND PROTEIN LEVEL IN DIETS FOR FATTENING LAMBS (Serbia)……..…… 333-347

P. Polák, J. Tomka, M. Margetín, D. Apolen, M. Gondeková, A. Oravcová, Z. Krupová
FATTENING ABILITY, CARCASS AND MEAT QUALITY AND RELATIONSHIPS BETWEEN ULTRASOUND MEASUREMENTS AND CARCASS QUALITY IN HEAVY LAMBS (Slovakia)…..…… 348-356

M. Kastelic, D. van Liere, A. Premik-Banič, N. Siard
THE ATTITUDE OF SLOVENIAN FARMERS TOWARDS WOLVES (Slovenia)……..…… 357-363

D. Sokolović, B. Dinić, G. Jevtić
FORAGE QUALITY, PRODUCTION AND CONSERVATION ON PERENNIAL GRASSES (Serbia)……..…… 364-381

A. Simić, Z. Tomić, S. Vučković, Z. Bijelić, V. Mandić
MEADOW MIXTURES IN SERBIA: CHALLENGES AND PERSPECTIVES (Serbia)……..... 382-398

Z. Bijelić, Z. Tomić, D. Ružić-Muslić, V. Mandić, A. Simić, G. Marinkov, Lj. Stojanović
GRASS-LEGUME SILAGES (Serbia)..... 399-415

V. Mandić, A. Simić, Z. Tomić, V. Krnjaja, Z. Bijelić, G. Marinkov, Lj. Stojanović
EFFECT OF DROUGHT AND FOLIAR FERTILIZATION ON MAIZE PRODUCTION (Serbia)……..... 416-429

ORALLY PRESENTED PAPERS

K. Fischer, U. Wuestemann, H. Schlegel, M. Waehner
COMPARISON OF AD LIBITUM AND RESTRICTIVE FEEDING OF FATTENING PIGS (Germany)……..... 430-436

H.A.W. Lengkey, F.R. Wolayan, M. Najoan, P. Edianingsih, B. Bagau
THE EFFECT OF FERMENTED MIXED COCONUT OIL AND TOFU SOLID WASTE SUPPLEMENT ON MEAT TENDERNESS AND CHOLESTEROL OF BROILER (Indonesia)…… 437-445

N. Puvača, V.S. Stanaćev, D. Milić, V.Ž. Stanaćev, Z. Pavlovski, Z. Škrbić
EFFECT OF EXTRUSION AND MICROWAVE ROASTING ON CHEMICAL COMPOSITION AND PROTEIN SOLUBILITY OF FLAXSEED INTENDED FOR BROILERS NUTRITON (Serbia)... 446-452

POSTER SECTION I

B. Stojanović, G. Grubić, N. Đorđević, A. Božičković, V. Davidović, A. Ivetić
EFFECTS OF DIET PHYSICALLY EFFECTIVE FIBER CONTENT ON FEEDING EFFICIENCY AND MILK PRODUCTION AT DAIRY COWS (Serbia)…….. 453-460

D. Kučević, S. Trivunović, M. Plavšić, M. Radinović, V. Bogdanović
CHARACTERISTICS OF FEEDING BEHAVIOUR OF DAIRY COWS DURING EARLY LACTATION (Serbia)……. 461-467

K. Krastev, S. Grigorova
SEASON'S INFLUENCE OF SOME ECOLOGICAL FACTORS ON MILK PRODUCTIVITY IN COWS (Bulgaria)…… 468-476

M. Vićentijević, R. Mitrović, V. Vuković
SAFETY OF GOLIJA MILK AND CHEESE WITH RADIATION-HYGIENIC ASPECTS (Serbia)…….. 477-488

D. Stanojević, R. Đedović, V. Bogdanović, R. Beskorovajni, P. Perišić, M. Popovac, N. Popović
HERITABILITY AND REPEATABILITY ESTIMATION OF MILK YIELD TRAITS OF BLACK AND WHITE COWS (Serbia)……... 489-496

B. Pisinov, A. Kasalica, V. Vuković
QUALITY CONTROL OF MILK AND MILK PRODUCTS BASED ON PHYSICOCHEMICAL PROPERTIES (Serbia)…….. 497-503

L.K. Kozelov, M.R. Yossifov
BIOFUEL INDUSTRY' BYPRODUCTS – ALTERNATIVE OF TRADITIONAL PLANT PROTEIN SOURCES IN RUMINANT' DIETS (Bulgaria)……. 504-520

M. Petričević, S. Aleksić, M.M. Petrović, N. Stanišić, M. Gogić, D. Nikšić, V. Petričević
SLAUGHTER TRAITS, CARCASS COMPOSITION AND MEAT QUALITY OF CATTLE SLAUGHTERED AT DIFFERENT BODY WEIGHTS (Serbia)…….. 521-527

M.M. Petrović, S. Aleksić, D. Ostojić-Andrić, M.P. Petrović, V. Pantelić, N. Stanišić, M. Petričević
THE EFFECT OF CROSSING SIMMENTAL CATTLE WITH FRENCH BEEF CATTLE BREEDS ON SLAUGHTER PROPERTIES AND QUALITY OF MEAT (Serbia)…….. 528-535

D. Nikšić, M.M. Petrović, V. Pantelić, D. Ostojić-Andrić, V. Caro-Petrović, P. Perišić, M.D. Petrović
VARIABILITY OF MILK TRAITS IN THE POPULATION OF SIMMENTAL CATTLE IN SERBIA (Serbia)…… 536-542

M. Lazarević, M.M. Petrović, V. Pantelić, D. Ružić-Muslić, V. Bogdanović, R. Đedović, M.D. Petrović
STUDY OF THE VARIABILITY OF MILK TRAITS IN THE POPULATION OF HOLSTEIN FRIESIAN CATTLE IN CENTRAL SERBIA (Serbia)……. 543-549

S. Aleksić, M.M. Petrović, V. Pantelić, D. Ostojić-Andrić, N. Stanišić, M. Petričević, D. Nikšić
EATING QUALITY OF BEEF MEAT (Serbia)……. 550-557

V. Vuković, J. Kečkeš, M. Vićentijević, G. Luković
EXAMINATION OF SULFAMETHOXAZOLE AS ONE OF THE INITIAL SUBSTANCES IN FINISHED MEDICINAL PRODUCT AD US.VET. (Serbia)…….. 558-563

S. Ćirić, Z. Ilić, B. Milošević, J. Stojković, Z. Spasić, N. Stolić, B. Ristanović
PRESENCE AND SOURCES OF FAECAL CONTAMINATION OF DRINKING WATER SOURCE (Serbia)…… 564-571

T.P. Popova, M.D. Kaleva, B.D. Baykov, B.S. Zaharinov, S.M. Marinova-Garvanska
MICROBIOLOGICAL AND EPIZOOTOLOGICAL CHARACTERIZATION OF MATERIALS FROM WASTEWATER TREATMENT PLANT (Bulgaria)……. 572-579

B. Zaharinov Z. Shindarska, S. Garvanska, V. Kirov, B. Baykov
AGROECOLOGIC VALUATION OF ORGANIC WASTE IN DIFFERENT TECHNOLGIES OF STORAGE (Bulgaria)…… 580-589

M. Stupar, V. Vidović, D. Lukač
BARRIERES IN TRANSGENES APPLICATION IN CONTEMPORARY LIVESTOCK PRODUCTION (Serbia)…… 590-601

S. Savić, B. Vidić, Ž. Grgić, A. Potkonjak, D. Sakač
EMERGING VECTOR BORNE DISEASES – RISK FOR PUBLIC HEALTH (Serbia)…… 602-608

I. Stojanov, J. Petrović, M. Kapetanov, M. Živkov-Baloš, J. Prodanov-Radulović
THE FINDINGS OF SOME BEE PATHOGENS AND CCD SYNDROME (Serbia)…….....….. 609-617

R. Balkanska, M. Ignatova
PHYSICOCHEMICAL PARAMETERS OF BULGARIAN RAPE HONEY (*Brassica* spp.) AND CORIANDER HONEY (*Coriandrum sativum* L.) (Bulgaria)……. 618-626

T. Petrović, D. Vidanović, I. Stojanov, D. Lupulović, G. Lazić, N. Plavša, S. Lazić
FIRST MOLECULAR DETECTION OF SIX HONEYBEE VIRUSES IN SERBIAN APIARIES (Serbia)…….....……. 627-639

G. Nakev, P. Stamberov, I, Dimitrova, N. Stancheva, S. Georgieva, D. Hristova, G. Angelov, T. Mehmedov, K. Genova, A. Teneva
GROWTH AND DEVELOPMENT OF SKELETAL MUSCLE IN CONNECTION WITH THE EXPRESSION OF THE MYOSTATIN GENE (MSTN)* (Bulgaria)……. 640-647

POSTER SECTION II

M. Dokmanović, M.Z. Baltić, N. Karabasil, N. Glamoclija, S. Pantić, R. Marković, M. Todorović
FACTORS OF IMPORTANCE FOR SUCCESSFUL ELECTRICAL STUNNING OF PIGS (Serbia)…… 648-654

K.P. Brüssow, I. Egerszegi, J. Rátky
RESULTS OF REPRODUCTIVE RESEARCH IN FEMALE MANGALICA PIGS (Germany)……. 655-663

J. Kureljušić, N. Jezdimirović, V. Vuković, D. Jakić-Dimić, S. Veskovič-Moračanin, M. Jezdimirović
THE ISOLATION OF LISTERIA MONOCYTOGENES FROM RBACON (Serbia).....… 664-669

V. Vidović, A. Stoisavljević, D. Lukač, Lj. Štrbac, M. Stupar
CARCASS QUALITY AND MEAT OF FATTENING PIGS SIRES LANDRACE AND YORKSHIRE (Serbia)……. 670-681

N. Metodiev, S. Gochev, M. Ignatova
STUDY ON FECUNDITY OF HYBRID SOWS (Bulgaria)……. 682-689

M. Todorova, M. Ignatova
EFFECT OF FEEDING RAPESEED MEAL TO WEANED PIGS ON PERFORMANCE AND TOTAL SERUM CHOLESTEROL CONCENTRATIONS (Bulgaria)…… 690-696

D. Andronikov, D. Naseva, N. Taskov, D. Saneva, A. Kuzelov
CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF FRESH, FROZEN AND EMULSIONS OF PORK SKINS (Macedonia)..... 697-704

A. Kuzelov, D. Naseva, N. Taskov, D. Saneva, D. Spasova, D. Andronkov
IMPACT OF FUNCTIONAL MIX AND STARTER CULTURES ON THE SENSORY PROPERTIES OF PERMANENT SAUSAGES PRODUCED IN INDUSTRIAL CONDITIONS (Macedonia)…….. 705-712

J. Bojkovski, T. Vasiljević, A. Vasić, N. Zdravković, D. Stojanović, D. Rogožarski
ANIMAL HEALTH CONTROL OF PIGS ON COMERCIAL FARMS (Serbia)…… 713-722

J. Kecman, M. Waehner
WHICH AMOUNT OF TOTAL ENERGY REQUIREMENT OF SUCKLING PIGLETS CAN COVERED BY MILK OF SOWS? (Germany)……. 723-730

H. Schlegel, K. Fischer, M. Waehner
CLUSTER ANALYSIS – A STATISTICAL TOOL TO ANALYSE THE COMPLEX RELATIONSHIP WITHIN DIFFERENT PARAMETERS IN PIGS (Germany)…… 731-739

B. Živković, W. Migdal, G. Cilev, Č. Radović, M. Gogić, G. Marinkov, Lj. Stojanović
THE EFFECTS OF RELATIONSHIP OF METABOLISABLE ENERGY, LYSINE AND THREONINE IN THE DIETS OF THE FIRST TWO THIRDS ON GESTATION OF SOWS (Serbia)……. 740-750

M. Gogić, M. Petrović, B. Živković, Č. Radović, D. Radojković, N. Stanišić, D. Stanojević
THE EFFECT OF GENOTYPE, YEAR, AND FARM ON THE VARIABILITY OF TRAITS IN THE PERFORMANCE TEST OF GILTS (Serbia)…… 751-760

A. Softić, A. Kavazović, V. Katica, V. Šakić, A. Katica, N. Mlaćo, M. Varatanović
INFLUENCE OF STOCKING DENSITY ON CARCASS QUALITY OF BROILERS (Bosnia and Herzegovina)…… 761-768

Đ. Okanović, R. Čolović, D. Milić, N. Vukelić, V. Zekić, T. Tasić, P. Ikonić
THE IMPACT OF PHYTOGENIC ADDITIVES ADDED INTO DIET ON ECONOMIC RESULTS OF BROILERS PRODUCTION (Serbia) 769-775

M. Živkov-Baloš, Ž. Mihaljev, S. Jakšić, Ž. Ćupić, M. Kapetanov
CONCENTRATION OF ARSENIC IN WATER AND TISSUES OF BROILERS (Serbia)…… 776-783

J. Petrović, V. Đorđević , I. Stojanov, D. Milanov, S. Stefanović
DETECTION OF FLUOROQUINOLONE RESIDUES BY MICROBIOLOGICAL SCREENING METHOD – FLUMEQUINE (Serbia)…… 784-793

M. Kapetanov, D. Potkonjak, M. Živkov-Baloš, I. Stojanov, D. Milanov, Ž. Mihaljev
PREDISPOSING FACTORS OF CLOSTRIDIOSIS IN COMMERCIAL POULTRY FLOCKS (Serbia)…… 794-803

D. Potkonjak, M. Velhner, E. Nikolić-Đorić, M. Kapetanov, D. Orlić, A. Potkonjak, B. Lako
UNEXPECTED SEROLOGICAL FINDINGS IN BREEDERS VACCINATED AGAINST NON-TYPHOID *SALMONELLA* (Serbia) 804-814

V. Dosković, S. Bogosavljević-Bošković, Z. Pavlovski, B. Milošević, Z. Škrbić, S. Rakonjac, V. Petričević
EFFECT OF PROTEASE ON MEAT YIELD OF BROILERS (Serbia) 815-823

A. Bočarov-Stančić, J. Lević, M. Bodroža-Solarov, V. Pantić, N. Salma, J. Vučković
MYCOLOGICAL DETOXIFICATION OF AFLATOXIN B_1 AND OCHRATOXIN A *IN VITRO* (Serbia)…….. 824-834

M. Ignatova, V. Sredkova, E. Petkov, M. Todorova
EFFECT OF DIETARY PROBIOTIC ON EGG QUALITY (Bulgaria) 835-840

M. Đukić-Stojčić, N. Milošević, L. Perić, S. Bjedov
PLUMAGE CONDITION AND FOOT PAD LESIONS OF MEDIUM GROWING BROILERS REARED EXTENSIVELY IN THE POULTRY HOUSE AND IN TRADITIONAL FREE RANGE (Serbia)…… 841-846

R. Stefanov, M. Chervenkov, E. Kistanova, D. Kacheva, B. Georgiev, P. Taushanova, G. Nenkova, A. Aleksandrova
LIPID PEROXIDATION AND MOTILITY OF DRAKE SPERMATOZOA AFTER 24 HOURS OF STORAGE (Bulgaria)…… 847-853

L. Perić, D. Žikić, M. Đukić-Stojčić
EFFECT OF PRESTORAGE INCUBATION ON HATCHABILITY OF LONG-TERM STORED BROILER BREEDER EGGS (Serbia). 854-858

T. Pandurevic, S. Mitrovic, V. Djermanovic, V. Djekic, M. Lalovic
THE INFLUENCE OF THE LOHMANN BROWN LAYING HENS' AGE ON EGG WEIGHT AND STRUCTURE (Serbia)…… 859-868

Lj. Janković, B. Radenković-Damnjanović, M. Vučinić, Š. Pintarič
MANURE TREATMENT WITH RED EARTHWORMS *(Lumbricus rubellus)* AND POSSIBILITY OF USE OF BIOMASS FOR POULTRY FEED (Serbia)……. 869-883

N. Tolimir, L. Perić, N. Milošević, M. Đukić-Stojčić, M. Maslovarić
IMPACT OF NUTRITION ON GROWTH DYNAMICS AND QUALITY OF BROILER CARCASS OF DIFFERENT GENOTYPES (Serbia)…… 884-893

F.R. Wolayan, A. Rochana, I. Setiawan, Y. A. Hidayati
THE EFFECT OF COCONUT WASTE WITH TOFU WASTE MIXTURE FERMENTED BY *Aspergillus niger* ON BROILER PERFORMANCE (Indonesia)…… 894-901

V. Petričević, Ž. Jokić, M. Lukić, Z. Škrbić, Z. Pavlovski, D. Vitorović, M. Petričević
EFFECT OF USE OF RAW SOYBEAN IN THE FINAL MIXTURES FOR BROILER CHICKENS ON BODY WEIGHT, RELATIVE WEIGHT OF THE PANCREAS AND THE EDIBLE INNER ORGANS (Serbia)…… 902-910

POSTER SECTION III

T.A. Magomadov, V.A. Shatalov
THE RUSSAN HISTORY OF DAIRY GOAT FARMING (Russia) 911-917

J. Stojković, Z. Ilić, M.P. Petrović, V. Caro-Petrović, I. Đorđević, S. Ćirić
THE EFFECT OF DIFFERENT PROTEIN SOURCES IN THE DIET ON GOAT PRODUCTION PERFORMANCE DURING FATTENING (Serbia)……. 918-924

T. Ivanova, E. Raicheva
STUDY ON THE EFFECT OF SOYPASS ON THE SHEEP MILK PRODUCTION (Bulgaria)……. 925-935

N. Pacinovski, G. Dimov, E. Eftimova, N. Mateva, G. Cilev
SOME FACTORS OF THE MAXIMUM TEST DAY MILK YIELD IN THE DAIRY POPULATION OF SHEEP IN MACEDONIA (Macedonia)…… 936-941

G. Talevski
USAGE OF PALM OIL IN THE CHEESE PRODUCTION (Macedonia)…….....…. 942-951

P. Slavova, S. Laleva, Y. Popova
COMPARATIVE STUDY OF FERTILITY IN A STANDARD MATING PROCEDURE AND AFTER HORMONAL TREATMENT TO INDUCE OESTRUS AND OVULATION (Bulgaria)……. 952-958

M.R. Yossifov, L.K. Kozelov, M.A. Petkova
EFFECT OF DRY DISTILLER' GRAINS WITH SOLUBLES FROM CORN (DDGSc) ON SOME WETHER` BIOCHEMICAL PARAMETERS (Bulgaria)……. 959-969

A. Katica, N. Mlaćo, A. Hodžić, K. Podžo, A. Softić
HISTOLOGICAL CHARACTERISTICS OF THE DUBSKA PRAMENKA PITUITARY GLAND DURING THE LACTATION PHASE (Bosnia and Herzegovina)…….....…… 970-978

Y. Aleksiev, S. Stoycheva, P. Zunev, Ts. Hristova, Ts. Maslev, G. Dimov
THE EFFECT OF PARITY ON PARTURITION PATTERN IN BULGARIAN WHITE DAIRY GOATS (Bulgaria)…….. 979-985

N. Memiši, S.V. Moračanin, M. Žujović, N. Stanišić, Z. Tomić
VARIABILITY OF PHYSICAL AND CHEMICAL PARAMETERS IN RAW SHEEP MILK DURING SEASONAL PURCHASE (Serbia) 986-993

T. Harizanova–Metodieva
APPLYING AN ECONOMETRIC MODEL TO FORECAST THE QUANTITY OF PRODUCED SHEEP MILK (Bulgaria)…….. 994-1004

V. Simin, I. Pihler, M. Krajinović, M. Žujović, V. Tomović
CARCASS PARAMETERS AND YIELD OF SAANEN MALE KIDS (Serbia)…… 1005-1014

I. Pusic, D. Lupulovic, J. Prodanov-Radulovic, M. Urosevic, Z. Grgic
SEROLOGICAL STUDY ON *Brucella* spp. AND SMALL RUMINANT LENTIVIRUS IN DAIRY GOATS IN VOJVODINA (Serbia)…….. 1015-1021

M.R. Yossifov
EFFECTS OF RAPESEED MEAL AS PROTEIN SOURCE IN CEREAL-BASED DIETS ON LAMB PERFORMANCE (Bulgaria)… 1022-1031

A. Cividini, M. Kastelic
THE EFFECT OF INTROGRESSED ROMANOV BREED ON LITTER SIZE IN IMPROVED JEZERSKO-SOLČAVA BREED (Slovenia)…… 1032-1039

M. Žujović, N. Stanišić, Z. Tomić, N. Maksimović, Z. Bijelić, V. Mandić
CARCASS CHARACTERISTICS AND SOME MEAT QUALITY PARAMETERS OF KIDS OF BALKAN GOAT BREED SLAUGHTERED AT DIFFERENT WEIGHTS (Serbia)…….. 1040-1048

C. Pascal., Costica C.
RESEARCHES REGARDING THE INDUSTRIAL CROSS EFFECT BETWEEN DIFFERENT BREEDS OF SHEEP OVER THE GROWING INTENSITY AND THE SLAUGHTER INDICATORS (Romania)…… 1049-1059

V. Caro-Petrović, M.P. Petrović, Z. Ilić, M.M. Petrović, A. Teneva, J. Stojković, D. Ružić-Muslić
SOME NON-GENETIC FACTORS INFLUENCING EARLY GROWTH TRAITS OF LAMBS (Serbia)……. 1060-1069

Ts. Hristova, S. Stoycheva
APPLICATION OF THE NON-HORMONAL METHODS FOR SYNCHRONIZATION OF ESTRUS IN EWES REVIEW (Bulgaria) 1070-1075

T. Popova
FATTY ACID COMPOSITION OF DIFFERENT ADIPOSE DEPOTS IN LAMBS REARED INDOORS AND ON PASTURE (Bulgaria)…….. 1076-1088

A. Popović-Vranješ, A. Kasalica, F. Bauman, M. Jevtić, D. Cvetanović, G. Grubješić
CHARACTERISTICS OF SJENIČKI EWE'S CHEESE WITH PROTECTED DESIGNATION OF ORIGIN (Serbia)…….. 1089-1097

M.A. Talebi
THE EFFECT OF SELECTION ON FATTY ACIDS COMPOSITION OF CARCASS FAT IN LORI-BAKHTIARI SHEEP (Iran)……. 1098-1104

R. Pivić, Đ. Glamočlija, D. Jošić, A. Stanojković-Sebić, Ž. Dželetović
THE POSIBILITY OF THE CERTAIN ALTERNATIVE CEREALS CULTIVATION FOR ANIMAL NUTRITION IN CLIMATIC AND SOIL CONDITIONS OF THE REPUBLIC OF SERBIA (Serbia)……. 1105-1116

D. Spasova, D. Spasov, B. Atanasova, M. Ilievski
ANALYSIS OF SOME OF THE TRAITS THAT DETERMINE THE PRODUCTIVITY OF OATS IN ORGANIC AND CONVENTIONAL PRODUCTION (Macedonia)……..…… 1117-1125

R. Dubljević, N, Đorđević, M. Damjanović, D. Mitrović
THE INFLUENCE OF SOWING DENSITY, COMPACTION DEGREE AND INOCULATION ON CHEMICAL COMPOSITION AND QUALITY OF MAIZE SILAGE (Serbia)…… 1126-1132

V. Maraš, B. Gašović, D. Drakić, J. Raičević, J. Djaković, V. Kodzulović, S. Šucur, N. Djordjević
INFLUENCE OF INOCULATION ON GRAPE POMACE SILAGE QUALITY SUPPLEMENTED WITH NON-PROTEIN NITROGEN (Montenegro)…….. 1133-1141

Z. Lopičić, A. Bočarov-Stančić, M. Stojanović, J. Milojković, V. Pantić, M. Mihajlović, M. Adamović
IN VITRO MYCOTOXINS ADSORPTION BY SOUR CHERRY STONES (Serbia)……. 1142-1153

M. Maslovarić, B. de la Roza-Delgado, S. Janković, J. Lević, R. Jovanović
DEVELOPMENT OF NIR CALIBRATION MODELS TO PREDICT CHEMICAL COMPOSITION AND *IN VITRO* ORGANIC MATTER DIGESTIBILITY OF WET WHOLE MAIZE SILAGE (Serbia)…….... 1154-1164

D. Terzić, B. Dinić, R. Stanisavljević, D. Đokić, J. Marković, J. Milenković, S. Anđelković
THE EFFECT OF CUTTING SCHEDULE ON ENERGY VALUE OF FIRST ALFALFA GROWTH (Serbia)…… 1165-1171

Z. Tomić, Z. Bijelić, V. Mandić, A. Simić, V. Caro-Petrović, M. Žujović
EFFECT OF N FERTILIZATION ON YIELD AND QUALITY OF GRASSES AND LEGUMES IN MONOCULTURE AND MIXTURE (Serbia)……. 1172-1181

J. Prodanov-Radulović, R. Došen, I. Pušić, T. Petrović, I. Stojanov
HEALTH STATUS CONTROL OF WILD BOARS IN THE HUNTING AREA OF VOJVODINA REGION (Serbia)…… 1182-1188

Z. Popović, B. Bojović, N. Đorđević, D. Beuković, M. Beuković, M. Đorđević
PRODUCTION RESULTS OF RING-NECKED PHEASANT PARENTS FLOCKS DEPENDING OF NUTRITION ON FARM AND YEAR (Serbia)…… 1189-1195

Ž. Mihaljev, M. Živkov-Baloš, M. Kapetanov, S. Jakšić
DETERMINATION OF TOXIC ELEMENTS IN WILD BIRDS FROM THE AREA OF VOJVODINA (Serbia)…….. 1196-1203

G. Angelov, I. Dimitrova, T. Mehmedov, P. Stamberov, N. Stancheva, S. Georgieva, G. Nakev
STUDIES ON SOME SERUM ENZYMES IN TWO BULGARIAN INDIGENOUS SHEEP BREEDS (Bulgaria)…….. 1204-1208

S. Grigorova, M. Petkova, K. Velikov
BIOLOGICAL EFFECT ESTABLISHMENT OF *JODIS CONCENTRATE* SUPPLEMENTATION IN RABBIT DOES (Bulgaria)……. 1209-1216

K. Velikov
INFLUENCE OF MATING UNTIL 48-TH HOUR POST WEANING ON THE REPRODUCTIVE PARAMETERS IN WHITE NEW ZEALAND RABBIT DOES (Bulgaria)……. 1217-1224

M. Dyavolova, D. Gudev, I. Yanchev, P. Moneva
FUNCTIONAL ACTIVITY OF THE ADRENAL GLANDS, RECTAL TEMPERATURE AND SOME HEMATOLOGICAL INDICES IN RABBITS REARED UNDER LOW AND HIGH INDOOR AMMONIA LEVELS (Bulgaria)…… 1225-1237

J. Tkaczewska, W. Migdał, M. Walczycka, P. Kulawik, P. Bajzík
THE COMPARISON OF NUTRITIONAL AND MICROBIOLOGICAL QUALITY OF CARP (*Cyprinus carpio* L.) AND RAINBOW TROUT (*Oncorhynchus mykiss*) FARMED IN SLOVAKIA AND POLAND (Poland)…….. 1238-1251

S. Lazić, D. Lupulović, G. Lazić, P. Gavrilović, D. Bugarski, T. Petrović
RESEARCH ON INCIDENCE AND EFFECTS OF VIRAL ARTERITIS ON HEALTH STATUS OF HORSES AT STABLES (Serbia)…… 1252-1259

Proceedings of the
10th International Symposium
Modern Trends in Livestock Production, October 2-4, 2013

STUDY OF THE VARIABILITY OF MILK TRAITS IN THE POPULATION OF HOLSTEIN FRIESIAN CATTLE IN CENTRAL SERBIA

M. Lazarević[1*], M. M. Petrović[1],V. Pantelić[1], D. Ružić-Muslić[1], V. Bogdanović[2], R. Đedović[2], M. D. Petrović[3]

[1] Institute for Animal Husbandry, Belgrade-Zemun, 11080 Zemun
[2] University of Belgrade, Faculty of Agriculture, Belgrade-Zemun, 11080 Zemun
[3] Faculty of Agronomy, 32000 Čačak
*Corresponding author: Marina Lazarević, e-mail: marinaplazarevic@gmail.com
Original scientific paper

Abstract: The work includes the review of production results, i.e. milk performance phenotypes of Black and White Holstein cows in Central Serbia. The analysis of quantitative phenotypic parameters was carried out in five regions (breeding regions) on several large and small farms which housed 1090 cows - first calving heifers.Using the method of Least Squares - the fixed model, highly significant deviation of milk yield, milk fat from the average ($P < 0.01$) was established. Cows reared in the region 4 in the first lactation produced 503 kg less milk compared to the general average and 852 kg less milk than those reared in the region 3. Birth year caused statistically significant differences in milk yield and milk fat yield ($P < 0.05$), except % of milk protein where no significant variations ($P> 0.05$) were determined. Season in which the cows had calved caused a highly significant deviation of milk yield ($P < 0.01$) and significant deviations of yields of milk fat and protein ($P < 0,05$).

Keywords: Holstein, cow, phenotype, milk, milk fat, protein

Introduction

Black and white Holstein Friesian cattle breed is the prevailing breed of dairy cattle in the world (about 90% of the total milk production). Holstein cattle are bred in Europe, mainly in the lower regions. In the Republic of Serbia around 100.000 cows and heifers of Holstein-Friesian breed are grown *(Petrović et al., 2013)*. The majority of them are reared in Vojvodina, a small number is grown in central Serbia. With the exception of cows that are reared in the vicinity of Belgrade organized in a very intense production of several large farms (PKB Padinska Skela, PIK Zemun, BD Agro Dobanovci, etc.), a number that is grown on

small farms in Central Serbia is small and amounts to a few thousand heads (under the milk recording control less than 3000). That is why our research was conducted and the goal was to determine how often in semi-intensive conditions of care and nutrition, quantitative genetic potential of milk production traits of the breed is exerted. In recent years (last decade) began breeding of this breed of dairy cattle on small farms in Central Serbia. Traditionally, farmers in these regions are directed towards the production of milk and meat from Domestic Spotted and Simmental cattle that are less demanding in terms of nutrition, rearing and that give excellent results in less intensive conditions (milk, meat). Market, competition, intensifying and specialization in manufacturing led to the need for growing od dairy breeds of cattle with improved milk performance and increasingly in these parts of Serbia farms are formed with higher number of cattle (15-50).

In addition to feeding and care, particular attention should be paid to the genetic improvement of cattle. Genetic improvement of Black and White cattle in Serbia is achieved by selection and breeding of Holstein - Friesian breed. Methods of genetic improvement are essentially based on the use of high-quality bulls of Holstein breed from domestic artificial insemination (AI) centers and the use of imported seed. Many of the domestic and foreign researchers and scientists are involved and are working on the improvement of milk production phenotypes that require continuous operation and include the systematic improvement of quantitative genetic traits and continuous work on their improved expression. High yield of milk, milk fat and protein, in addition to the selection measures requires providing of appropriate paragenetic factors (nutrition, housing, rearing, health care, etc.). The following authors have studied quantitative characteristics and performance data for this breed of cattle and the influence of paragenetic factors on same properties: *Gaidarsca et al. (2004), De Marchi et al. (2008), Pantelić et al. (2010; 2011), Pirlo et al. (2000), Petrović et al. (1999a;1999b), Kuczyńska et al. (2012)* and *Stojić et al. (2011).*

Material and Methods

Data included in the analysis were collected in five regions (breeding regions) in Central Serbia. The regions differ in terms of geographical characteristics and hence the production of feed for cattle feeding. The differences are in the method and the quality of the nutrition, management of production, the genetic quality of cattle, etc. The research included 1090 cows-first calving heifers of Black and White Holstein Friesian breed. These animals have calved, i.e. concluded the lactation in the period from 2010 to 2013. Calving years of these animals were divided into four seasons: I (February, March and April), II (May,

June and July), III (August, September and October), and IV (November, December and January).

The HF bulls-sires come from local AI centers, also imported bull semen from European populations of this breed was used. Cows- first calving heifers are kept in tie system and free, depending on the farm. Animals were fed in a usual way depending on the level of intensity of production and the breeding region and the difference was in the quality of feed, i.e. forage to concentrate ratio.

Statistical - mathematical analysis was performed by the Least Squares Mixed Model with fixed and random effects (LS - Least Squares and BLUP - Best Linear Unbiased Prediction) using the LSMLMW software *(Harvey, 1990)*. When analysing the influence of breeding region, year and season of calving on milk performance of dairy cows in first lactation, the following model was used:

$$Y_{ijkl} = \mu + R_l + G_j + S_k + b_1(x_1-x_2) + e_{ijklm}$$

Where:

Yijkl – individual animal (*m*) reared in area (*i*), calved in year (*j*) and season (*k*),
μ = general population average,
OP_l = fixed effect of breeding area (1-4),
G_j = fixed effect of year of calving (1-2),
S_k = fixed effect of the season (1-4),
b_1 = linear regression effect of age at calving,
e_{ijklm} = random error

Results and Discussion

Different number of individual animals in each class, as well as presence of several impacts/factors (breeding region, year of calving, calving season) that influenced the expression of the traits, caused an analysis in which the method of Least Squares was used. Table 1 shows the results of milk traits of cows - first calving heifers. They produced in the first lactation (305 days) 5924 kg of milk with 225.7 kg of milk fat and 190.1 kg of protein

Table 1. The mean (LSM) and errors of mean values (SE) of milk, fat and protein

Trait	QMSL,kg	MFCSL,%	MFYSL,kg	PCSL,%	PYSL,kg
LSM	5923.7	3.81	225.7	3.21	190.1
S.E.	202.7	0.03	7.99	0.02	6.23

Legend: QMSL,kg – quantity of milk in standard lactation, kg (305 days); MFCSL,kg – milk fat content in standard lactation,% (305 days); MFYSL,kg - milk fat yield in standard lactation, kg (305 days); PCSL, kg - milk protein content in standard lactation,% (305 days); PYSL,kg - milk proteint yield in standard lactation,kg (305 days)

Similar data on the Black and White milk cows in first lactation (5658 kg and 3.84% milk fat and 5543 kg and 3.68%) were obtained by *Petrović et al. (1999a)*.

However, Holstein-Friesian heifers, as reported by *Gaidarska et al. (2004)* have realized lower milk yield compared to our results (4300 kg). The superiority of Holstein-Friesian cows in terms of the yield of milk produced is confirmed by results ranging from 6221 kg with 3.57% milk fat to 8500 kg with 3.48% milk fat *(Petrović et al., 1999b; Kuczyńska et al, 2012; Pirlo et al., 2000; De Marchi et al., 2008; Stojić et al., 2011). Pantelić et al. (2011)* have established production of 10245 kg of milk with 3.53% of milk fat, in Holstein-Friesian cows in intensive production of bull dams (Agricultural Corporation Belgrade).

Table 2. The effect of paragenetic factors as LSM deviations ($\hat{c}_i$) of milk traits of cows - first calving heifers

Trait	QMSL,kg	MFCSL,%	MFYSL,kg	PCSL,%	PYSL,kg
μ	5923	3.81	225.7	3.22	190.9
S.E.	202.7	.03	7.99	.02	6.23
Breeding region	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$
1	334	-0.09	9.9	-0.08	4.9
2	-352	0.07	- 6.9	0.04	-7.8
3	349	-0.08	-11.0	0.08	10.1
4	-503	0.06	- 7.4	0.06	-8.9
5	171	0.03	14.5	-0.09	2.9
ANOVA $F_{exp.}$	**13.563****	**27.256****	**12.498****	**24.563****	**13.471****
Calving year	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$
1	227	-0.16	-1.2	0.06	9.1
2	-284	0.09	-4.2	0.05	-4.9
3	56	0.07	5.3	-1.1	-3.9
ANOVA $F_{exp.}$	**12.999***	**19.351 ***	**10.658***	**8.856^{NS}**	**9.001***
Calving season	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$	$\hat{c}_i$
1	420	- 1.1	5.8	1.6	23.9
2	276	- 0.7	7.9	0.1	11.5
3	-198	0.8	-3.1	-0.9	-14.2
4	-497	0.9	-10.5	-0.8	-21.1
ANOVA $F_{exp.}$	**14.801****	**20.987***	**11.565***	**17.987***	**13.876***

Legend: NS – P>0.05; * – P<0.05; ** – P<0.01; ANOVA - Least – Squares analysis of variance (exp. F)

The sum of a number of factors (paragenetic factors), which constitute a comprehensive term "breeding region" and its effect on milk traits is shown in Table 2. Using the method of Least Squares - fixed model, highly significant deviation was established in yield of milk and milk fat from the average ($P<0,01$). Thus, cows reared in the region 4 in the first lactation produced 503 kg less milk compared to the general average, and 852 kg less milk than those reared in the third region.

Calving year caused statistically significant deviations in milk yield and milk fat yield ($P<0.05$), except in case of % protein in milk for which no significant variations ($P>0.05$) were established. Season in which the cows had calved caused a highly significant deviation in regard to milk yield ($P<0.01$) and significant deviations in regard to yields of milk fat and protein ($P<0,05$). Cattle calved in December, January and February have produced 420 kg more milk than the general average, or 917 kg more milk than cows – first calving heifers which calved in the autumn months (Table 2).

Conclusion

Knowledge of the influence of external factors on quantitative traits is very important with respect to their importance in achieving breeding goals and good economic results. Very little research can be found on the results of studying the quantitative milk traits of Black and White Holstein Friesian dairy cattle in Central Serbia, except for a few large herds of Holstein cattle reared in large agricultural companies (near Belgrade). Analysis of the results in this paper suggests that animals of this breed have not achieved satisfactory production according to their genetic potential. The reason for this is inadequate hosuing/rearing, feeding technology and lack of optimal conditions for maximum expression of genetic capacity of the animal. With proper care, nutrition and implementation of zoo-technical measures bred/selected cattle will realize the production in accordance with their genetic potential. This means the genetic improvement of the breed by breeding and selection through quality bulls-sires and systematic improvement of the quantitative genetic traits and continuous work on their improved expression.

Acknowledgment

The study was financed by the Ministry of Education, Science and Technological Development of Republic Serbia within the project TR 3153

Ispitivanje varijabilnosti osobina mlečnosti populacije holštajn frizijskih goveda u centralnoj Srbiji

M. Lazarević, M.M. Petrović,V. Pantelić, D. Ružić-Muslić, V. Bogdanović, R. Đedović, M.D. Petrović

Rezime

Holštajn goveda se u Evropi gaje uglavnom u nižim predelima. U Republici Srbiji se gaji oko 100.000 krava i junica holštajn frizijske rase Najveći broj gaji se u Vojvodini a manji deo u centralnoj Srbiji. Ako se izuzmu krave koje se gaje u okolini Beograda u vrlo intezivnoj organizovanoj proizvodnji na nekoliko velikih farmi (PKB Padinska Skela, PIK Zemun, BD Agro Dobanovci i dr.), broj koji se gaji na malim farmama u Centralnoj Srbiji je mali i iznosi nekoliko hiljada grla (pod kontrolom mlečnosti manje od 3000). Upravo zbog toga su obavljena naša istraživanja a cilj je bio da ustanovimo kako se u često poluintezivnim uslovima nege i ishrane, ispoljava genetski potencijal kvantitativnih osobina mlečnosti ove rase. U poslednjoj deceniji počelo je gajenje ove rase mlečnih goveda na malim farmama u Centralnoj Srbiji. Tradicionalno, farmeri u ovim regionima su okrenuti proizvodnji mleka i mesa domaće šarene odnosno simentalske rase goveda koja je manje zahtevna u pogledu ishrane, odgoja i koja u manje intezivnim uslovima daje odlične rezultate (mleko, meso).

Podaci obuhvaćeni analizom su prikupljeni u pet regiona (odgajivačka područja) u Cenralnoj Srbiji. Regioni se razlikuju u pogledu geografskih karakteristika a samim tim u proizvodnji hraniva za ishranu krava. Razlike su u načinu i kvalitetu ishrane, menadžmentu u proizvodnji, genetskom kvalitetu grla i dr. Istraživanjem je obuvaćeno 1090 grla krava-prvotelki crno bele odnosno holštajn-frizijske rase. Statističko matematička analiza obavljena je primenom mešovitog modela najmanjih kvadrata sa fiksnim i random uticajima (LS - Least Squares i Blup - Best linear Unbiased Prediction) primenom programa najmanjih kvadrata.

Različit broj individua u pojedinim klasama kao i postojanje više uticaja (region gajenja, godina telenja, sezona telenja) koji su delovali na ispoljavanje ispitivanih osobina , uslovio je analizu u kojoj je korišćen metod najmanjih kvadrata. Prvotelke su u prvoj standardnoj laktaciji (305 dana) proizvele 5924 kg mleka sa 225.7 kg mlečne masti i 190.1 kg proteina. Primenom metoda najmanjih kvadrata, a pomoću fiksnog modela, ustanovljena su visoko značajna odstupanja prinosa mleka, mlečne masti od opšteg proseka ($P<0.01$). Tako su krave gajene u području 4 u prvoj laktaciji proizvele za 503 kg mleka manje u odnosu na opšti prosek i 852 kg mleka manje u odnosu na one koje su gajene u trećem regionu. Godina telenja je prouzrokovala statistički analizirano značajna odstupanja prinosa

mleka i mlečne masti (P<0.05) osim % proteina u mleku gde nisu ustanovljena značajna variranja (P>0.05). Sezona u kojoj su krave bile oteljene prouzrokovala je visoko značajno odstupanje prinosa mleka (P<0.01) i statistički značajna odstupanja prinosa mlečne masti i proteina (P<0.05). Grla oteljena u decembru, januaru i februaru su proizvela 420 kg mleka više u odnosu na opšti prosek ili 917 kg mleka više u odnosu na krave – prvotelke oteljene u jesenjim mesecima.

References

DE MARCHI M., BITTANTE G., DAL ZOTTO R., DALVIT C., CASSANDRO M. (2008): Effect of Holstein Friesian and Brown Swiss Breeds on Quality of Milk and Cheese. Journal of Dairy Science, 91, 4092–4102.

GAIDARSCA V., RUSEV N., POPOVA Y. (2004): Correalation between the breeding indicators of black and white cows in Bulgaria. Biotechnology in Animal Husbandry 20, 1-2, 17-21.

HARWEY W.R. (1990): Mixed Model Least Squares and Maximum Likelihood Computer Program. User, s Gguide for LSML MW and MIXMDL.

KUCZYŃSKA B, PUPPEL K, OŁĘBIEWSKI M, KORDYASZ M, GRODZKI H, BRZOZOWSKI P. (2012): Comparison of fat and protein fractions of milk constituents in Montbeliarde and Polish Holstein-Friesian cows from one farm in Poland. Acta veterinaria Brno, 81, 139–144.

PANTELIĆ V, SAMOLOVAC LJ, ALEKSIĆ S, TRIVUNOVIĆ S, PETROVIĆ M.M, OSTOJIĆ-ANDRIĆ D, NOVAKOVIĆ Ž. (2010): Heritability of type traits in first calving Black and White cows. Archiv Tierzucht, 53, 5, 545-554.

PANTELIĆ V, NIKŠIĆ D, TRIVUNOVIĆ S. (2011): Variability and heritability of type traits of Holstein-Friesian bull dams. Biotechnology in Animal Husbandry, 27, 3, 305- 313.

PETROVIĆ M.M., ALEKSIĆ S., PETROVIĆ M.P., PETROVIĆ M., PANTELIĆ V., NOVAKOVIĆ Ž., RUŽIĆ-MUSLIĆ D. (2013): Potentials of Serbian livestock production: Outlook and future. Biotechnology in Animal Husbandry, 29, 1, 1-17.

PETROVIĆ M.M., LAZAREVIĆ R., ALEKSIĆ.,MIŠČEVIĆ., NIKITOVIĆ N. (1999a): Milk capacity of black and white cattle depending on genetic and paragenetic factors. Biotechnology in Animal Husbandry, 15, 1-2, 21-27.

PETROVIĆ M.M., LAZAREVIĆ LJ., ALEKSIĆ S., MIŠČEVIĆ B., PERKOVIĆ S., ILIĆ Z. (1999b): Comparative Investigation of the Heritabilty of Milkiness Phenotypes in the Daughters of Simmental and Holstein Friesian Bull-Sires in Serbia. Biotehnology in Animal Husbandry, 15, 5-6, 125-132.

PIRLO G., MIGLIOR M., SPERONI M. (2000): Effect of Age at First Calving on Production Traits and on Difference Between Milk Yield Returns and Rearing Costs in Italian Holsteins. Journal of Dairy Science,
83, 3, 603–608.

STOJIĆ P., RADIVOJEVIĆ M., JELUŠIĆ D., SAMOLOVAC LJ.,