



**Official Journal of
the Animal Science and
Production Association
(ASPA)**

*

**ISSN 1594-4077
eISSN 1828-051X**

*

www.aspajournal.it

*

**Italian Journal
of Animal Science
2015; volume 14
supplement 1**

italian journal of animal science

**ASPA 21st Congress
Milano, June 9-12, 2015**

Book of Abstracts

Guest Editor: Giovanni Savoini

Italian Journal of Animal Science

Official Journal of the Animal Science
and Production Association

ISSN 1594-4077
eISSN 1828-051X

Editor-in-Chief

Rosanna Scipioni, Università degli Studi di Modena e Reggio Emilia
(Italy)

Section Editors

Marcello Mele, Università degli Studi di Pisa (Italy), Deputy Editor

Luca M. Battaglini, Università degli Studi di Torino (Italy)

Umberto Bernabucci, Università degli Studi della Tuscia, Viterbo
(Italy)

Rui José Branquinho Bessa, Universidade Técnica de Lisboa
(Portugal)

Cesare Castellini, Università degli Studi di Perugia (Italy)

Beniamino T. Cenci Goga, Università degli Studi di Perugia
(Italy)

Giulio Cozzi, Università degli Studi di Padova (Italy)

Juan Vicente Delgado Bermejo, Universidad de Córdoba
(Spain)

Luca Fontanesi, Alma Mater Studiorum-Università di Bologna
(Italy)

Oreste Franci, Università degli Studi di Firenze (Italy)

Michael A. Grashorn, University of Hohenheim (Germany)

Juan J. Loor, University of Illinois at Urbana-Champaign (USA)

Nicolò Pietro Paolo Macciotta, Università degli Studi di Sassari
(Italy)

Antonino Nizza, Università degli Studi di Napoli (Italy)

Giuliana Parisi, Università degli Studi di Firenze (Italy)

Giovanni Savoini, Università degli Studi di Milano (Italy)

Giuseppe Stradaoli, Università degli Studi di Udine (Italy)

Editorial Staff

Lucia Zoppi, Managing Editor

Cristiana Poggi, Production Editor

Tiziano Taccini, Technical Support

Publisher

PAGEPress Publications

via Giuseppe Belli 7

27100 Pavia, Italy

Tel. +39.0382.1751762 – Fax: +39.0382.1750481

info@pagepress.org – www.pagepress.org





Italian Journal of Animal Science

The Italian Journal of Animal Science is an international peer-reviewed journal publishing original scientific papers, reviews and short communications on animal science, animal production and related areas. It includes sections on: animal derived food quality and safety; reproduction and physiology (ruminants and non-ruminants); animal production (management, behaviour, welfare, health); wildlife; livestock management and landscape; nutrition and feeding (ruminant and non-ruminant); genetics (quantitative and molecular) and breeding; aquaculture.

Upon request to the Editor, announcements of congresses, presentations of universities, research institutes, books and proceedings may also be published, as well as news regarding the members of the Animal Science and Production Association (ASPA). The Association will be glad to receive proposals for your admission as ordinary or corresponding member: please read regulations and procedures in the ASPA statute. available at http://www.aspajournal.it/public/aspa_statute.pdf.

The publication of manuscripts is subject to the approval of referees and in agreement with the Advisory Board's opinions; referees will be selected from among qualified scientists in the international scientific community.

2013 Impact factor: 0.604. ©JCR Thomson Reuters

Copyright

PAGEPress has chosen to apply the Creative Commons Attribution License (CCAL) to all manuscripts to be published. An Open Access Publication is one that meets the following two conditions: The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving. Authors who publish with this journal agree to the following terms: 1. Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under a Creative Commons Attribution License that allows others to share the work with an acknowledgement of the work's authorship and initial publication in this journal. 2. Authors are able to enter into separate, additional contractual arrangements for the non-exclusive distribution of the journal's published version of the work (e.g., post it to an institutional repository or publish it in a book), with an acknowledgement of its initial publication in this journal. 3. Authors are permitted and encouraged to post their work online (e.g., in institutional repositories or on their website) prior to and during the submission process, as it can lead to productive exchanges, as well as earlier and greater citation of published work (See The Effect of Open Access).

Peer-review policy

Submission of a manuscript implies that all authors have viewed and approved the paper for release and that each author is responsible for its content. To facilitate the reviewing process, authors are encouraged to have the manuscript reviewed by others before submission. When submitting the manuscript to the journal, authors may indicate reviewers they consider not acceptable because of possible bias in manuscript evaluation or, on the contrary, propose experts as possible reviewers. After a preliminary check of the article, the Editor-in-Chief assigns it to a member of the Editorial Board (Section Editor), who identifies two reviewers for assistance in the evaluation of the paper submitted and to recommend the acceptance or the rejection of the manuscript. If all referees recommend acceptance or rejection, the decision stands. If the opinions of the referees tie, the Editor-in-Chief and the Section Editors have the authority to decide upon the acceptance or rejection of the paper.

Reviewers are asked to maintain confidentiality with respect to the information presented in the manuscript and should inform the editor of any possible conflict of interest which may bias their judgement. Reviewers should render their opinions in an unbiased and fair manner, provide helpful guidance to authors in writing and return the manuscript to the journal within 3 weeks. Manuscripts that require revisions are returned by the journal to the corresponding author for improvement.

The revised manuscript, edited in .doc format, should be resubmitted electronically to the Section Editor (on <http://www.aspajournal.it>) within 28 days from the date of receipt by the author. If the revised manuscript is returned to the journal after the allotted time, it will be considered a new submission.

Authorship. All persons designated as authors should qualify for authorship according to the CSE' criteria (<http://www.councilscienceeditors.org/4a/pages/index.cfm?pageid=3355>) Each author should have participated sufficiently in the work to take public responsibility for the content. Authorship credit should be based only on substantial contributions to (a) conception and design, or analysis and interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final approval of the version to be published. These three conditions must all be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is not sufficient for authorship. Any part of an article critical to its main conclusions must be the responsibility of at least one author. In relevant cases of experimentation on animals, Authors may be required to provide the original authorization of their institutional Ethical Committee.

Italian Journal of Animal Science

Journal registered in Pavia, Italy, n. 2/2010-INF.

Direttore Responsabile: Rosanna Scipioni.

Ownership: Animal Science and Production Association (ASPA)

C-114

Not published

C-115

Genetic correlations among selected traits and inbreeding depression in dual purpose Rendena breed

Cristina Sartori, Nadia Guzzo, Serena Mazza,
Roberto Mantovani

Dipartimento di Agronomia Animali Alimenti Risorse Naturali e Ambiente, Università degli Studi di Padova, Legnaro (PD), Italy
Corresponding author: cristina.sartori@unipd.it

Selection in native cattle breeds requires great attention because of the smaller population size and the greater risk of inbreeding (F) as compare to bigger populations. Moreover, native breeds are usually dual purpose, and selection involves antagonistic traits, i.e., milk and meat attitudes. Focusing on Rendena cattle (~4,000 breeding cows), the present work aimed to study F depression and genetic correlations (r) in the following traits: milk, fat, protein (milk yield traits, MY), and udder correctness (Ud), for milk attitude; muscularity (Mu), average daily gain (ADG) and *in vivo* estimated carcass traits (Ca) for meat production. An amount of 28¹,497 MY test-day data collected on 1⁶,974 cows during routinely milk recording were considered, whereas Ud and Mu were obtained from linear type traits scored on 1¹,992 primiparous cows. ADG and Ca were measured on 1¹,428 young bulls at performance test (i.e., up to 1¹ months of age). Individual F was estimated including incomplete pedigree information. A series of bi-trait REML animal models were used to assess genetic parameters, and genetic trends were drawn as linear regression (b) on estimated breeding values (EBV) standardized on mean 1⁰⁰ and standard deviation of 1⁰ points. The effect of F was evaluated by introducing individual F in the models and considering the change in EBV for each percentage point of F increase (b'). Heritabilities varied from 0.¹⁷ (MY) to 0.38 (Ca). Low but negative r were found within milk traits MY-Ud ($r=-0.¹⁴$), suggesting negative impact of milk yield on udder form. About meat traits, positive r were found in Mu-Ca ($r=0.57$) and ADG-Ca ($r=0.38$). ADG showed low r with all other traits. The antagonism of dual purpose selection was evident in MY-Mu ($r=-0.33$), whereas close to zero r were found in MY-Ca ($r=-0.06$). Genetic trends reflect the stronger selection for milk attitude realized: MY EBVs are increasing ($b=1.4$ since 2000), but Mu EBVs are decreasing ($b=-0.5$), while ADG and Ca are slightly increasing ($b=0.8$). An F depression was found in all traits (average $b'=-0.33$), except for MY ($b'=0.35$), meaning that the greater MY EBVs are in more inbred animals. Results suggest a slight but progressive change toward a milk conformation in the breed, and a relative greater increase in F due to a bigger selection pressure on MY. A proper breeding policy should account for aspects as r and F to make choic-

es in a long-term perspective and limit the chance of F depression.

Acknowledgments

The research was funded by National Breeders Association of Rendena breed (ANARE).

C-116

Genetic diversity of Mediterranean cattle breeds related to geography and climate

Roberta Ciampolini¹, Sara Casu², Salvatore Mastrangelo³, Laurence Flori^{4,5}, Katayoun Moazami-Goudarzi⁴, Tiziana Sechi², Francesca Cecchi¹, François Casabianca⁶, Anne Lauvie⁶, Mathieu Gautier⁷, Antonello Carta², Baldassare Portolano³, Denis Laloë⁴

¹*Dipartimento di Scienze Veterinarie, Università degli Studi di Pisa, Italy*

²*Settore Genetica e Biotecnologie, AGRIS Sardegna, Sassari, Italy*

³*Dipartimento Scienze Agrarie e Forestali, Università degli Studi di Palermo, Italy*

⁴*Institut national de la recherche agronomique, AgroParisTech, Génétique Animale et Biologie Intégrative, France*

⁵*Centre International de Recherche Agronomique pour le Développement, Interactions Hôtes Vecteurs Parasites Environnement dans les maladies tropicales négligées dues au trypanosomatidés, Montpellier, France*

⁶*Institut national de la recherche agronomique, Laboratoire de Recherche pour le Développement de l'Élevage, Corte, France*

⁷*Institut national de la recherche agronomique/Institut de Recherche pour le Développement/Centre International de Recherche Agronomique pour le Développement, Montpellier SupAgro, Centre de Biologie pour la Gestion des Populations, Montferrier-sur-Lez, France*

Corresponding author: rciampol@vet.unipi.it

In recent decades, changes in climate have caused impacts on natural and human systems. Mediterranean countries will be particularly affected by this phenomenon, with growing temperatures and reduced rainfall. Understanding how species and ecosystems respond to climate change has become a crucial focus in biodiversity conservation and management. The genome-wide SNP panels allows providing background information on genome structure in domestic animals, opening new perspectives to livestock genetics. The International Project GALIMED "Genetic Adaptation of Bovine Livestock and production systems in MEDiterranean region", develops an integrated approach that combines the analysis of SNP markers, bioclimatic variables and farming system information to identify genotypes and breeding practices able to respond to climate change. Italian and Corsican local breeds are part of this project. The aim of the study is to identify genomic regions related to adaptation to climate change in these local breeds. Individuals of Cinisara (71),

Modicana (72), Maremmana (25), Piemontese (21), Romagnola (21), Sarda (30), Sardo-Modicana (28) and Corse (31) breeds were genotyped using Bovine SNP 50k. Farming systems data were collected by interviewing breeders. Geographic coordinates and 19 bioclimatic variables were also available. Principal Components Analysis (PCA) was performed on SNPs data and climatic variables. Co-inertia (CIA) analysis was realized to detect a possible common structure between such different information. After edits, 43,625 SNPs were retained. The PC1 on individual genotypes differentiates Modicana from other breeds, and shows that Sardo-Modicana is close to Modicana, but is clearly admixed to another breed. The PC2 differentiates Cinisara from a cluster “Romagnola/Maremmana” and shows a large variability of the Modicana breed. The CIA coefficient between molecular data and both geographic and climatic information is equal to 0.38, (P -value=0.001), suggesting evidence of genetic adaptation to different climatic pressures. Further analyses are on going to identify the genetic regions with a potential adaptive role. The results will provide a solid scientific foundation to reconsider objectives and selection criteria and to improve farming practices to prepare livestock to new environmental conditions.

Acknowledgments.

This work was partially funded by INRA metaprogramm ACCAF, “Misura 214 PSR 2007-2013 RAS” RisGenSar project and “PON02_00451_3133441”

C-117

Genomic inbreeding estimation in small populations: evaluation of runs of homozygosity in local cattle breeds

Salvatore Mastrangelo, Marco Tolone, Maria Teresa Sardina, Rosalia Di Gerlando, Luca Fontanesi, Baldassare Portolano

Dipartimento di Scienze Agrarie e Forestali, Università degli Studi di Palermo, Italy

Corresponding author: salvatore.mastrangelo@unipa.it

The availability of high throughput genotyping has facilitated the quantification of inbreeding by genomic markers in farm animals. Run of homozygosity (ROH) are contiguous lengths of homozygous genotypes and represent an estimate of the degree of autozygosity at genome-wide level. The current study aims to quantify the genomic inbreeding derived from ROH (FROH) in three Italian local cattle breeds. Individuals of Cinisara (71), Modicana (72), Reggiana (168) were genotyped with the 50K v2 Illumina BeadChip. Genotypes from 96 animals of the Italian Holstein cattle breed were included in the analysis. The following criteria were used to define a ROH: two missing SNPs; one heterozygous SNP; minimum density of 1 SNP every 100 kb; maximum gap between consecutive SNPs of 1 000 kb. We used a definition of ROH as tracts of homozygous genotypes that were >4

000 kb in length with a minimum number of 40 SNPs included in the run. Across all four breeds, we identified 3,661 ROH. The Modicana breed showed the highest mean number of ROH for individual (11.03) and the highest value of FROH (0.053), whereas the Reggiana showed the lowest values (7.15 and 0.033, respectively). The three most homozygous animals present in our dataset were from the Cinisara (676.9 Mb), Modicana (681.2 Mb) and Reggiana (725.2 Mb), with almost a quarter of their genome classified as ROH. Differences among breeds existed for the ROH length. The individuals of Reggiana and Italian Holstein breeds showed high number of shorter ROH segments, whereas the Sicilian breeds showed ROH characterized by the presence of large segments. In fact, in all breeds, most ROH segment coverage was in the shorter length categories (4-8 Mb), but the Sicilian breeds presented the highest percentage of ROHs (12%) inside the ROH length category >24Mb. Therefore our results showed the presence of inbreeding due to recent consanguineous matings and a lack of gene flow from other herds and breeds. ROH analyses represent an important instrument that may be used in inference of population history and to associate with important production and disease traits. Considering that the increased of inbreeding leads to different negative effects, our results showed the necessity of implementing conservation programs to preserve the local breeds.

C-118

The distinctive mitochondrial DNA signature of Podolic cattle in Italy

Simone Ceccobelli¹, Piera Di Lorenzo¹, Hovirag Lancioni², Irene Cardinali², Licia Colli³, Marco Rosario Capodiferro², Luca Ferretti⁴, Paolo Ajmone Marsan³, Francesco Panella¹, Emiliano Lasagna¹, Alessandro Achilli²

¹*Dipartimento di Scienze Agrarie, Alimentari e Ambientali, Università degli Studi di Perugia, Italy*

²*Dipartimento di Chimica, Biologia e Biotecnologie, Università degli Studi di Perugia, Italy*

³*Istituto di Zootecnica, Università Cattolica del Sacro Cuore, Piacenza, Italy*

⁴*Dipartimento di Biologia e Biotecnologie, Università di Pavia, Italy*

Corresponding author: simo.ceccobelli@tiscali.it

The domestication of wild aurochs (*Bos primigenius*), starting ~10,000 years ago, was an important step in human history with its cultural and socioeconomic implications for ancient populations. Nowadays, there are around two thousands cattle breeds recognized worldwide. An ancient group of breeds are known as Podolic cattle, which are thought to be descendants of the first domesticated animals or even directly of the wild ones. The name indicates a possible origin in the Podolia region of Ukraine, from where these animals spread in Europe. These grey