



# Globaldiv

## GLOBALDIV NEWSLETTER

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### EDITORIAL - CONSERVATION BIOLOGY

Conservation biology is a branch of life sciences stemmed in recent times. The raise of this discipline was induced by the growing public awareness of several animal and plant species being in danger of extinction. A species is commonly considered at risk of extinction when its population size is drastically reduced by the consequences of e.g. habitat loss or degradation, overexploitation and so on. When it comes to livestock species, we are rarely inclined to think that they may be facing extinction risk as well.

Nowadays, cattle, sheep and goats are raised worldwide with total population sizes of several millions animals per species. In the case of wildlife, such numbers would usually assure the long term survival of the species and the preservation of high levels of genetic diversity; this was also true for livestock, at least until a dramatic change in management practices occurred, starting with the establishment of the concept of breed about 200 years ago and culminating in the last decades with the introduction of strong selection practices to improve productivity and to fix interesting traits.

The origin of livestock genetic diversity dates back to the domestication events, when a subset of the molecular variability of wild ancestors was sampled during the process and became the starting gene pool of domesticated stocks. The spread of agriculture out of the Fertile Crescent (about 10000 years ago) was followed by a number of both small and large scale migratory events which further shaped the livestock genetic diversity; the control exerted by humans on livestock reproduction strongly contributed to the rise of locally adapted populations, usually displaying useful features as disease resistance, homing and gregarious behavior, tolerance to poor forage etc. Traditionally, particular attention was also paid to avoid inbreeding through husbandry practices that minimized consanguinity of individuals within herds.

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The sudden change in management practices occurred in the last centuries led to the fragmentation of the original populations into several well-defined breeds, often subject to high selective pressures. These changes were accompanied by deep modifications in the agricultural practices and in the economy both at a regional and a global scale: the progressive abandonment of agriculture in marginal areas together with the diffusion of industrial breeding have led farmers to progressively substitute the less productive, but locally adapted, autochthonous breeds with highly productive cosmopolitan breeds, thanks to the use of vaccines and therapeutics against endemic diseases.

The introduction of artificial insemination further amplified the loss of overall genetic diversity; in fact, if on the one hand this practice allows the fast dissemination of valuable genes from a few sires with high breeding values, on the other hand it causes the loss of many genetic variants. The real extent of this phenomenon can be better understood if we consider the cases of the French Holstein or the Japanese black cattle were, despite census sizes of 2.5 and 0.56 million animals, the effective population sizes (that is to say, the number of animals actively reproducing and thus passing their genes to the next generation) are 46 and 17.2 individuals, respectively. Furthermore, the use of few sires per generation dramatically alters the sex ratio and may lead to unwanted inbreeding: high consanguinity levels have negative effects on productivity and mostly on reproductive traits, as demonstrated by the recent decrease in fertility observed in some countries during the last 10-20 years.

When we consider the effects of the synergic interaction of these factors, it is clear that livestock genetic resources, most of all those of cattle, sheep and goats, need to be considered endangered, in particular where changes in management practices were deeper. It is therefore necessary to adopt in the near future adequate measures to guarantee the conservation of livestock genetic diversity and to promote the sustainable management of these invaluable resources, because our future depends largely and undoubtedly on our ability to produce food from domestic animals.

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## NEWS

### GLOBALDIV 2<sup>nd</sup> Working Group Expert Meeting

The GLOBALDIV project will organize the 2<sup>nd</sup> Working Group (WG) of Experts in Mariensee at FAL premises on March 18th and 19th 2008. The 20 selected experts with different experiences in FanGR will meet to write review papers on the state of the art of GLOBALDIV topics.

### Articles

- S. Joost, A. Pointet - "A dedicated Geographic Exploration Interface for the monitoring of worldwide Farm Animal Genetic Resources". Available at: <http://ncg.nuim.ie/geocomputation/>

In this paper, we propose a dedicated Geographic Exploration Interface (GEI) on the Internet able to exploit genetic, socio-economic and environmental data to watch over the global state of FAnGR, and to support conservation decisions. This research comes within the scope of GLOBALDIV, a European project for the dissemination of current advanced and integrated methodologies for the characterization, evaluation prioritization and conservation of livestock genetic resources ([www.unicatt.it/zootecnica/globaldiv](http://www.unicatt.it/zootecnica/globaldiv)).

- Li, M-H., Tapio, I., Vilkki, J., Ivanova, Z., Kiselyova, T., Marzanov, N., Cinkulov, M., Stojanovic, S., Ammosov, I., Popov, R., and Kantanen, J. 2007. Genetic structure of cattle populations (*Bos taurus*) in northern Eurasia and the neighboring Near Eastern regions: implications for breeding strategies and conservation. *Molecular Ecology* 16 (18): 3839-3853.
- Tapio, M., Ozerov, M., Viinalass, H., Kiseliova, T., and Kantanen, J. 2007. Molecular genetic variation in sheep of the central Volga area inhabited by Finno-Ugric peoples. *Agricultural and Food Science*, 16 (2): 157-169
- Li, M-H., Zerabruk, M., Vangen, O., Olsaker I., and Kantanen, J. 2007. Reduced genetic structure of north Ethiopian cattle revealed by Y-chromosome analysis. *Heredity* 98: 214-221.



## Events calendar

Many events concerning different issues related to GLOBALDIV project will take place in the coming months. Here is a selection of conferences and other events sorted by date:

1. International Society for Animal Genetics (ISAG), 20 - 24 July 2008  
Amsterdam, Netherlands; [www.isag2008.nl](http://www.isag2008.nl)
2. The 13<sup>th</sup> Animal Science Congress of the Asian - Australasian Association of Animal Production Societies. Theme: Animal Agriculture and the role of small holder farmers in a global economy. Hanoi, Vietnam, 22 - 26 September, 2008;  
[www.aaap2008.org.vn/AboutVietnam.htm](http://www.aaap2008.org.vn/AboutVietnam.htm)
3. WCAP 2008 - The 10<sup>th</sup> World Conference on Animal Production, 23 - 28 November 2008, Cape Town; [www.wcap2008.co.za](http://www.wcap2008.co.za)
4. 13<sup>th</sup> World's Poultry Congress. 30 June - 4 July 2008, Brisbane, Australia; [www.xpc2008.com](http://www.xpc2008.com)
5. 59<sup>th</sup> Annual Meeting of the European Association for Animal Production, Vilnius, 24 - 27 August 2008; [www.eaap2008.org](http://www.eaap2008.org)

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