Ramljak, J.[1], Ivankovic, A.[1], Kelava, N.[1], Konjacic, M.[1], Medugorac, I.[2]

[1]Department of Animal Production and Technologz, Faculty of Agriculture, Svetosimunska 25, 10000 Zagreb, Croatia

[2]Institute for Animal Breeding, Ludwig-Maximilians-University Munich, Veterinaerstr. 13, 80539 Munich, Germany

# GENETIC DIVERSITY ANALYSIS OF ISTRIAN CATTLE ASSESED BY MICROSATELITTE MARKERS

## Introduction

Istrian Cattle (IC) is a native Croatian cattle population, which belongs *Bos primigenius* type, bred in peninsula Istra and used for meat production. In 1998. year it's included in active government subvention system. Although, in recent times increasing in population number is recorded, the effective population size is still small (Ne=68,41).

Acoording to FAO standards IC is considered as an endangered-maintained breed. To establish useful breeding program for IC it is necessary to shape bulls lines and verify it at DNA level, so the aim of this study was to explore genetic diversity of IC in order to get an overview of the current status.

## Materials and methods

In total DNA from 51 unrelated animals sampled from IC was analysed using 97 microsatellite markers. Selecting microsatellite markers, sequecing and genotipization were performed on LMU, Muenchen. Genotypes are stored in Data Bank Paradox10. The statistical analysis was carried out using the following software: Fortran (personal created programmes), GenePop v3.4 (*Exact test*), *Assignment test* (Doh protocol), *Bottleneck test* v1.2.02. and Phylip package (TreeView). In order to compare subdivision parameters ($F_{ST}$ and *Nm*), two populations of native cattle are included, Croatian Busha (CB) and Slavonian Syrmian Podolian Cattle (SSP).





Fig.1: Istrian Cattle on outcome. Fig. 2: Calf of Istrian Cattle. Fig. 3: Bull. Fig. 4: Cow of Istrian Cattle

## Results

| | | |
|---|---|---|
| **Heteroyzgosity expected** | 0,65 (0,2 - 0,85) | |
| **Mean number of alleles** | 6,52 (2 - 11 ) | |
| **Polymorphism Information Content (PIC)** | 0,604 (0,07 - 0,82) | |
| **Hardy-Weinberg equilibrium (HWE)** | departure 8 loci (p<0,01) | |
| **$F_{ST}$ value** | 0,07 | variability among breeds |
| | 0,93 | variability within individuals IG |
| ***Nm* value** | 3,286 | |
| ***Bottleneck test*** | loss a minor part of genetic diversity through genetic *drift* and selection | |
| ***Assignment test*** | 96% of all individuals are assigned to correct breed | |

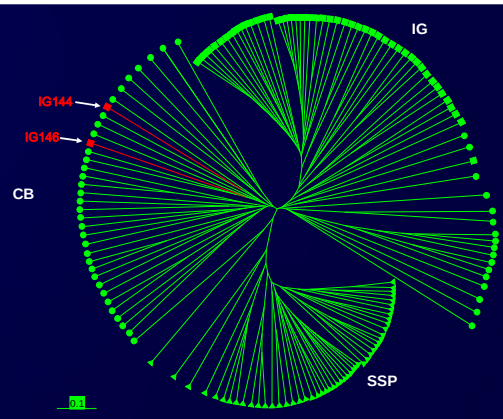


Fig.5: The neighbour-joining tree of individuals of IC, CB and SSP. Red colored are individuals of IC incorrect assign into CB population.

## Conclusions

- Istrian Cattle shows high level of genetic diversity
- Population are still significantly differentiated
- Bottleneck analysis indicate on certain loss of alleles
- This estimation of genetic variability and it's results will be integrated in breeding programmes of Istrian Cattle in Croatia.
- After DNA validation of present bulls lines, introducing new genome for upgraded will be considered.

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## Literature

Ivankovic at al. (2006): The genetic structure and sustainability of autochthonous cattle breeds in Croatia. Stockbreeding Vol.60 No.1, 47-51.

Croatian Livestock Centre (2006): Annual report.

FAO (1997).