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Aneuploidy rates in ‘in vitro’ matured MII oocytes with corresponding first polar body in the Podolian and Maremmana cattle breeds by using dual color fluorescent in situ hybridization (FISH)

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This study provides preliminary data for establishing a ‘baseline-level’ of aneuploidy in the female germ cells of two Italian autochthonous cattle (*Bos taurus*) breeds, the Podolian and Maremmana, by FISH applied on MII metaphase oocytes with the corresponding first polar body (PB). Painting probes for chromosomes Xcen and 5 were obtained by microdissection and DOP-PCR. COCs from 15 Podolian and 11 Maremmana cows were matured in vitro in TCM199 with 20% FCS, 0.5 µg/ml FSH and 5 µg/ml LH. After denudation, the oocytes were individually fixed on slides with 1:1 Carnoy fixative. Totally, out of 396 COCs selected for IVM, 305 reached the MII stage (77.0%); of these, 31 (10.2%) were unreduced. Out of 274 MII reduced oocytes, 200 (73.0%) had visible PB, therefore were FISH analyzed. Aneuploid oocytes were 4 out of 200 (2.0%), 3 were nullisomic and 1 disomic, all for chromosome 5. Premature separation of sister chromatids (PSSC) was found only in two oocytes (1%), one for each breed. At breed level, out of 100 oocytes examined in the Podolian, two were found to be nullisomic and one disomic, all for chromosome 5; out of 100 oocytes examined in the Maremmana, only one oocyte was found to be nullisomic for chromosome 5. Interestingly, chromosome X was never involved in aneuploidy. Totally, the two breeds showed different aneuploidy rates: 3% (Podolian) vs 1% (Maremmana). These preliminary results, together with previous results obtained on the Friesian and Brown breeds, suggest that ‘interbreed’ differences can be found among the various domestic breeds. This aspect is worth to be further investigated.