

IS THERE A ROLE FOR MITOCHONDRIAL INHERITANCE IN SHEEP BREEDING?

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Abstract. Mitochondrion is a cytoplasmic organelle of the eucaryotes. The versatile tasks of mitochondria in cell biology include the energy supply, maintenance of redox potential, production of heat and free radicals, as well as storing of calcium and modulation of calcium signals. Nuclear DNA codes many of the proteins that function in the mitochondrion, but the mitochondrion has also a genome of its own. In mammals the mitochondrial DNA (mtDNA) codes 37 genes. MtDNA has been widely employed in phylogenetic and phylogeographic studies. The distribution of mtDNA variation has shown greater degree of temporal inertia than that of nuclear genes and it seems to reflect often the primary spreading of the species rather than a secondary gene flow. In domestic sheep two divergent groups of mitochondria are found. One is found only in Europe and the other is rare in Europe, but prevails elsewhere. The new data from Northern European sheep confirms the existence of both main types in many European breeds. There are no comprehensive studies of mitochondrial effects in sheep and the characterisation of DNA variation lays ground for exploring associations of mtDNA variation with sheep phenotype variation also for breeding purposes.

Keywords: *Ovis aries*, mitochondria, genetic diversity, maternal inheritance.