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Loss of genetic variability due to selection for black coat colour in the rare Mallorquí horse

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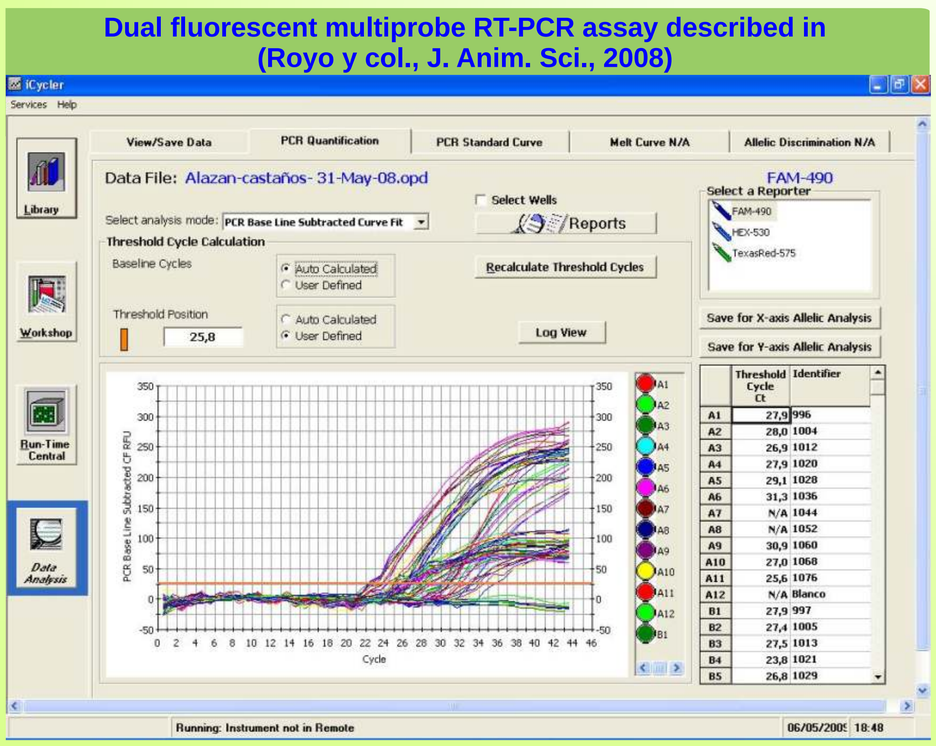
The Mallorquí horse is a rare black-coated breed kept in the Mallorca Island. A recovery program started in early 70's with the foundation of the studbook. Population size is very small, with less than 300 individuals registered at December 2006. The breeders association do not register chestnut individuals in its studbook and, therefore, carriers of the chestnut allele tend to be not used for reproduction.

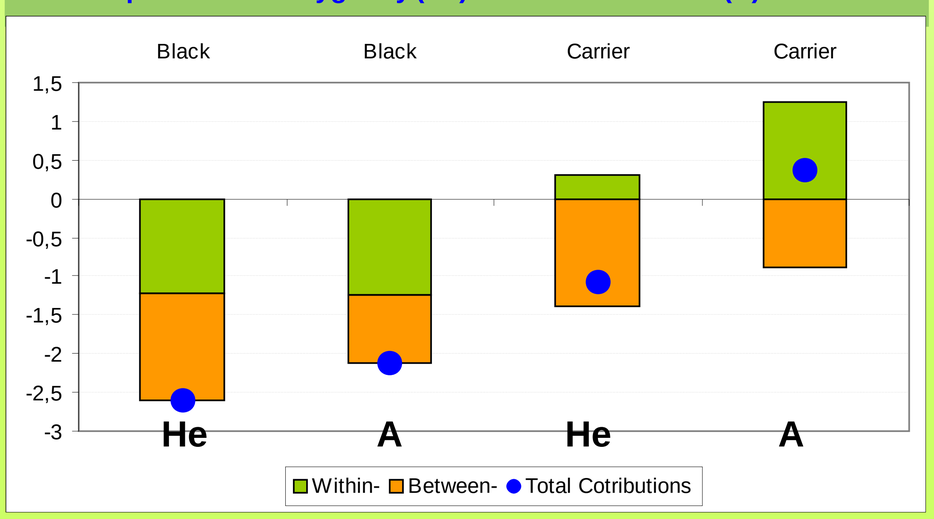
The aim of this work is to assess the possible loss of genetic variability caused by a selection regime consisting in only using for reproduction homozygous black individuals. A total of 68 samples of Mallorquí horse reproductive individuals were obtained and genotyped for a set of 15 microsatellites. Presence of the chestnut allele was asses via RT-PCR (Royo et al., 2008, J. Anim. Sci. 86:1291-1295). A total of 14 individuals were carriers. Possible losses of genetic variability were assessed using the program MolKin 3.0 (Gutiérrez et al., 2005, J. Hered. 96: 718-721) which is freely available at http://www.ucm.es/info/prodanim/html/JP_Web.htm. Genetic variability was assessed in terms of: a) expected heterozygosity or gene diversity; and b) rarefacted average number of alleles per locus. Rejecting carriers for reproduction would give losses of 1.1% in gene diversity and 0.4% in allelic richness.

These values can be interpreted by comparing them with those obtained for the homozygous black individuals: losses of 2.6% in gene diversity and increase in allelic richness of 2.1%.Within the Mallorquí horse, those individuals carrying the chestnut allele gather a significant part of the genetic variability of the breed. Particularly, these individuals seems to own a significant part of the rare alleles of the breed. This scenario suggests the need to implement a mating policy aiming at maintaining in the breeds the genetic background represented by the group of individuals carrying the chestnut allele. **Partially funded by a grant MICIN-INIA RZ2008-00010.**

Dual fluorescent multiprobe RT-PCR assay described in (Royo y col., J. Anim. Sci., 2008)



Bargraph shoing contributions to total diversity of the chesmut-carrier allele and the homozygows-black subpopulations in the mallorqhi horse expected heterozygosity (He) and allelic richness (A).



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