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Investigating The Genetic Status of Bali Cattle in Indonesia Using Large Scale Genotyping

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ABSTRACT : Bali cattle belong to the family Bovidae, where also European (*Bos taurus*) and Zebu (*Bos indicus*) cattle belong. Mitochondrial data has shown that Bali cattle had a different ancestor than European and Zebu cattle. Today the breed has become widely distributed all over Indonesia and has also been introduced to Australia and Malaysia. In a first survey of genetic variation in Bali cattle 154 animals were genotyped on the Bovine HD SNP chip consisting of 750 000 SNPs. The SNPs have been ascertained in Bos taurus and Bos indicus, therefore Bos javanicus display lower levels of genetic diversity when compared to taurine and indicine cattle and in order to correct for the bias extensive filtering needs to be done. In comparison to taurine and indicine cattle Bali cattle are genetically distinct, and the HD chip can thus be used for screening for pure Bos javanicus animals and also to investigate population structure within the breed. The animals analysed here were part of a phenotypic study of animals from Kalimantan, Sumatra, Lombok and Bali. Our investigation indicate that there are differences in size between females from Kalimantan, Sumatra and Lombok, the genetic data suggest that these differences most likely are the result of management, whereas size differences between males from Bali and Lombok may well be the results of both management and genetics. Interviews revealed some problems with inbreeding and lack of knowledge regarding breeding and breeding strategies in all villages which could pose a threat to the genetic diversity of the Bali cattle breed. In a village in Lombok where the awareness of inbreeding was lower the animals also displayed lower genetic variation. We show that the HD SNP chip is a fast and relatively cheap way to assess the genetic status of the breed.

Keywords: Bali cattle, Genetic diversity, Single Nucleotide Polymorphism, Population structure