

Impact of insulin-like growth factor-II polymorphisms on growth and reproductive traits in rabbits

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ABSTRACT

Biological effects of the insulin-like growth factor (IGF) system include increased glucose uptake, antiapoptotic activity, stimulation of DNA and RNA and protein synthesis. So, the IGF system has long been associated with growth and reproduction. Deletion of one bp in a non-coding regulatory region of the intron after the first coding exon of rabbit IGF-II was abbreviated to c.156+61delA indel and included A and Del alleles. Thus, the aim of the present study was to evaluate distribution allele frequency and effects of IGF-II polymorphisms on productive, carcass, reproductive and milk yield traits in a population of 284 rabbits. The genomic DNA of rabbit and the specific primers for IGF-II c.156+61DelA indel were used in PCR amplification. The IGF-II c.156+61DelA indel was genotyped by restriction fragment length polymorphism (RFLP). The frequency of A and Del alleles in IGF-II were 0.37 and 0.63, respectively. Association analysis indicated that Del/Del genotype was significantly associated ($P < 0.05$) with heavy weight in the bunnies at 10th week of age and high DBWG within interval 5-10 week of age. The IGF-II polymorphisms had significant ($p < 0.05$) effects on most of carcass traits. The IGF-II polymorphisms did not significant affect milk yield and reproductive traits except the litter size at birth in rabbit does. Del allele in IGF-II c.156+61DelA indel could be a favourable allele in rabbit and may be used in marker-assisted selection (MAS) plans to improve growth performance of rabbits.

Key words: Rabbits, insulin-like growth factor-II, reproductive traits, growth traits.

INTRODUCTION

Currently, research in molecular biology has led to the generation of techniques and knowledge that assist and complement the traditional system of genetic improvement. Marker-assisted selection (MAS) may represent a possible option for designing a suitable breeding scheme for livestock with productive and reproductive traits. The candidate gene approach applies to the

knowledge about functions of genes that might be involved in the trait of interest. The selected candidate genes are tested for association with the trait or phenotype. The candidate gene approach has particularly been successful for relatively simple traits (Teneva and Petrović, 2010). Actually, few studies have been carried out on candidate genes in rabbit related to reproduction, meat deposition and growth traits in rabbits by Garcia *et al.* (2010) and Fontanesi *et al.*, (2011 and 2012)