

学位論文要旨	
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題目	Relationship between DNA markers and production traits in Japanese Silky fowl (日本の烏骨鶏における DNA マーカーと生産形質との関連性)
<p>The Silky fowl is famous in China and Japan because of its unique medical properties and high quality meat and eggs for human health. But, Adult Silky fowl are characterized by low body weight and limited yearly egg production comparing with commercial chicken breeds. The egg production rate of the Silky fowl is very low because of broodiness. In this study, to improve the growth and egg production of Silky fowl, candidate genes and DNA markers was selected to assess their relationship with growth and egg production trait of Japanese Silky fowl. Researchers in China and Japan have identified a 24-bp In/Del polymorphisms in the 5'-flanking region of the <i>PRL</i> gene in Chinese native Yuehuang, Taihe Silky and Japanese Silky. Out of three genotypes (In/In, In/Del and Del/Del) of In/Del locus, only two genotypes (In/Del and Del/Del) have been detected in Taihe and Japanese Silky but no In/In Silky individuals have been found. That's why, in this study, to judge the unique characteristics of Silky fowl, male and female individuals with the In/Del locus in the fourth generation of the Silky fowl selection population were crossed to produce the In/In Silky individuals. In the first part of this study, investigated the genetic relationship between the production traits and the genotypes of In/Del locus of <i>PRL</i> gene, DNA markers of <i>DRD2</i> and <i>NPY</i> gene on chromosome 2 and 24 in the In/Del x In/Del population. Analysis of variance (ANOVA) was used for relationship between the production traits and the genotypic effects of <i>PRL</i>, <i>NPY</i> and <i>DRD2</i>. In this study, 27 Del/Del, 39 In/Del, and 21 In/In female individuals and 13 Del/Del, 26 In/Del and 17 In/In male individuals were found. All In/In individuals showed the Silky fowl characteristics. A significant effect of neuropeptide Y was found on eggshell strength ($p < 0.05$) in female birds and a significant effect of prolactin and dopamine D2 receptor gene was found on the body weight at 50 day in male birds ($p < 0.05$). In the second part of this study, the relationship between five DNA markers on the Z chromosome and production traits in the 5th generation of the Oita's Silky fowl population was examined. Genotyping of the DNA markers was performed using PCR-RFLP. The relationship between DNA markers and production traits was analyzed by linear mixed model using SAS Mixed procedure. The linear model involved the main effects of the hatching group, genotype effects of five DNA markers on the Z chromosome. Genotypes and trait values were obtained for 202 female and 58 male individuals of the 5th generation. In the females, <i>rs16773406</i> showed significance for egg production rate ($p < 0.05$) and for body weight at 150 day ($p < 0.001$). Marker <i>rs15991083</i> showed significance for average egg weight ($p < 0.05$). In the males, <i>embigin</i> and <i>rs15991083</i> showed significance for body weight at 150 days of age ($p < 0.05$) whereas <i>rs16763148</i> and <i>rs16773406</i> showed significance for body weight at 300 days of age ($p < 0.05$).</p>	