

畜試土雞品系L9母雞 Z 染色體上SNP基因型與產蛋性能的分析

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前言

產蛋數是蛋雞與種雞的重要經濟性狀。單核苷酸多態性(Single nucleotide polymorphism, SNP)指的是DNA序列上發生的單個核苷酸鹼基之間的變異，在族群中這種變異的發生頻率至少大於1%，否則被認為是點突變。SNP由於在全基因組中的分布密度高、數目眾多且不易突變，因此被認為是最好應用的遺傳標記。本試驗利用雞的Z染色體上131組SNP引子組檢測分析92隻畜試土雞品系L9母雞個體DNA，並將檢測出的SNP基因型與母雞產蛋性能進行關聯性分析，以建立種雞產蛋性能基因選種的候選遺傳標記。

材料與方法

- 1.應用台灣畜產種原中心之「雞育種資料庫」中畜試土雞品系L9選育族群母雞的產蛋性能記錄與DNA庫中的92隻母雞個體血液DNA。
- 2.使用 Agena MassARRAY 技術平台配合 iPLEX gold 反應 (Agena, San Diego, CA) 進行SNP 基因型分析。
- 3.將檢測出的SNP 基因型分析 與母雞的產蛋性能進行 SAS GLM分析。



結果與討論

利用雞Z染色體上131組SNP引子組檢測分析92隻畜試土雞品系L9母雞個體DNA，並將檢測出的SNP基因型與母雞產蛋性能進行關聯性分析。其中有82組SNP引子組所檢測出基因型在所有檢測個體皆為單型外，其它49組引子組皆有檢測出不同基因型。將母雞SNP基因型與其產蛋性能進行差異性分析，有3組引子組的不同基因型在母雞初產日齡有顯著差異(表1)，分別有3組與5組引子組的不同基因型在母雞初產體重與蛋重有顯著差異，有2組引子組的不同基因型在母雞達40週齡的產蛋數有顯著差異(表2)，各有3組引子組所檢測出的不同基因型在母雞達40週齡的體重與平均蛋重有顯著差異，而有4組引子組的不同基因型在母雞達280日齡的賴菴天數有顯著差異(表3)。

表1. 畜試土雞品系L9不同SNP基因型母雞初產日齡之比較

Marker	A allele	B allele	F value
LRI1109	141±11 (84)	150±12 (8)	0.0422
LRI1113	147±11 (31)	140±11 (52)	0.0051
LRI1117	146±10 (30)	140±12 (8)	0.0195

表2. 畜試土雞品系L9不同SNP基因型母雞達40週齡的產蛋數之比較

Marker	A allele	B allele	F value
LRI1019	91.5±22.7 (87)	65.8±38.3 (5)	0.0202
LRI1113	82.9±24.6 (31)	95.0±22.6 (52)	0.0257

表3. 畜試土雞品系L9不同SNP基因型母雞達40週齡賴菴天數之比較

Marker	A allele	B allele	F value
LRI1019	1.3±5.5(87)	7.2±16.1(5)	0.0483
LRI1046	12.0±20.8(3)	1.3±5.4(89)	0.0043
LRI1103	12.0±20.8(3)	1.3±5.4(89)	0.0043
LRI1137	12.0±20.8(3)	1.3±5.4(89)	0.0043

結論

比較畜試土雞品系L9母雞 Z 染色體上SNP不同基因型與其產蛋性能的差異分析，可提供該選育族群基因選種應用的候選遺傳標記之分子資訊。

Analysis of SNP genotypes on Z chromosome and laying performance in LRI-L9 hens

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To study the relationship between SNP genotypes on the Z chromosome of hens and their laying performance. In this experiment, 131 SNP primers on chicken Z chromosome were used to detect the individual DNA of 92 hens in the LRI-L9 selection flock, and the detected SNP genotypes were analyzed the correlation with laying performance of hens. Among them, 82 SNP primer kits detected genotypes in all tested individuals were single type, and other 49 primer kits detected different genotypes. Differences in hens' SNP genotypes and their laying performance were analyzed. We found that it was significant differences in the age at first egg of hens with different genotypes in 3 SNP primer kits ($P < 0.05$), and different genotypes in 3 and 5 SNP primer kits were significant difference in the body weight and egg weight at 1st egg of hens, respectively ($P < 0.05$). Different genotypes of hens detected by two SNP primer kits were significant difference in number of eggs laid up to 40 weeks of age. It was found different genotypes in each 3 SNP primer kits were significant difference in the body weight and egg weight at 40 weeks of age of hens, respectively ($P < 0.05$). while the hens with different genotypes detected by 4 SNP primer kits had significant differences in broody days up to 40 weeks of age ($P < 0.05$). This result provides molecular information on candidate genetic markers for this selection flock.