第三十九卷(2010)

水鹿類源關係與基因多樣性分析

日期2011/1/4 10:02:50

46.水鹿類源關係與基因多樣性分析

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應用鹿隻mtDNA cytb基因與D-loop區專一之引子對，進行32個水鹿樣品DNA之PCR增幅放大，純化產物後，進行序列解析，將最後所得之各30條序列分別建構類源關係演化圖，發現若以cytb基因序列分析時，水鹿族群可分成主要的兩群，一群由27條序列組成，另一群則由3條序列組成，但若以D-loop區序列進行比對分析時，則可得知水鹿族群可分成五群，由此顯示D-loop區序列的演化變異率較cytb基因為大。此外，以16組微衛星型遺傳標記分析32頭台灣水鹿之基因多樣性，發現其觀測異質度、期望異質度及多態性訊息量範圍分別為0－0.84、0－0.73及0－0.68，而其平均值則分別為0.32± 0.24、0.38 ±0.27及0.34 ± 0.25，可得知此群水鹿的基因多樣性屬於低度多態性資訊。

關鍵詞：水鹿、類源關係演化圖、基因多樣性。

PHYLOGENETIC AND GENETIC DIVERSITY ANALYSES OF SAMBAR DEER

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The primer sets specific to cytb gene and mitochondrial D-loop region of deer were designed and used to amplify 32 sambar deer DNA. After purification, the PCR products were sequenced by an automatic DNA sequencer. The sequences of cytb gene and D-loop region from 30 samples were used to construct phylogenetic trees, respectively. Based on cytb gene analysis, the phylogenetic tree had two clusters; one cluster was composed of 27 sequences, the other 3 sequences. Based on the mitochondrial D-loop sequence analysis, the 30 sequences were divided into five clusters. The result indicates that the evolution rate of D-loop region is faster than that of cytb gene. Besides, the genetic diversity analysis of 32 sambar deer was conducted by using 16 microsatellite markers. The values for observed heterozygosity (Ho), expected heterozygosity (He), and polymorphism information content (PIC) among all loci were in the range of 0－0.84、0－0.73 and 0－0.68, respectively. Furthermore, the mean values for Ho, He, and PIC were 0.32±0.24、0.38±0.27 and 0.34±0.25, respectively. The result indicates that the genetic diversity of this sambar deer population is low.

Key Words: Sambar deer, Phylogenetic tree, Genetic diversity.

台灣「高大型種豬」之評估研究

52.台灣「高大型種豬」之評估研究

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種豬骨架高大的選拔，可增加其後代肉豬屠體肉量。本試驗目的為進行中央畜產會種豬性能檢定站之各品種種豬體型評估，以瞭解台灣種豬骨架改良的情況。試驗期間自2005年7月至2010年10月於中央畜產會種豬性能檢定站，將生長性能檢定合格的六月齡種豬，於達七月齡時進行體型評鑑，並選取體型評鑑前三分之一進行體型排名，入選豬隻同時實施體型測量(包括：體長、體高、胸圍、胸深、胸寬、後寬及前管圍)。試驗豬隻，包括L、Y及D三個品種之公母豬，總計已評鑑2,296頭，體型測量者572頭。另六月齡生長性能檢定合格，七月齡並入選體型優良的種豬，其體長、體高及後寬等三個測量值加總為「體總長」，而體總長達270公分以上的七月齡種豬，名為「高大型種豬」。試驗結果顯示，通過生長性能檢定合格，且入選體型優良並有體測值的種公豬中，約有150頭藍瑞斯、44頭約克夏與325頭杜洛克，合計519頭，其體總長平均±SD分別依序為257.9±6.5、255.7±6.9與255.6±5.1公分，而其中符合 ”高大型種豬” 之藍瑞斯則有5頭（3.3%）、約克夏有2頭（4.5%）及杜洛克有2頭（0.6%）。

關鍵語：豬、體型、生長性能

The Evaluation of “The Tall Pig” in Taiwan

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The selection of large-frame breed pig could increase the meat quantity of their offspring. The aims of this study is to evaluate body conformation of breed pig for testing growth performance in pig performance testing station of National Animal Industry Foundation from July, 2005 to October, 2010. The breed pigs were measured body conformation which the top one third ranking champions by judging the body type in seven months old, and growth performance certified in six month of age. The item of the body conformation were to measure body length, body height, chest girth, depth, width, rear width, and girth of limb. There are total 2296 breed pigs to be judged body type, including Landrace, Yorkshire and Duroc, and all of them, 572 heads, to be measured the body conformation. The champion pigs of judging body type and growth performance certified were measured sum of length which including body height, body length and rear width, the sum of more than 270 cm are honored as ” The Tall Pig”. The results were showed that 150 Landrace, 44 Yorkshire, and 325 Duroc (total 519) were champion pigs, the average total length (mean±S.D.) are 257.9±6.5, 255.7±6.9 and 255.6±5.1 cm, respectively. There are five Landrace (3.3%) , two Yorkshire (4.5%) and two Duroc (0.6%) boars have the highest honor “The Tall Pig” when using those records.

Key Words: Pig, Body conformation, Growth performance

台灣杜洛克豬新品種選育：級進世代毛色與基因型頻率

56.台灣杜洛克豬新品種選育：級進世代毛色與基因型頻率

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台灣杜洛克豬新品種選育計畫目的是希望藉由雜交與級進的方式培育出適合台灣生長的高繁殖效率種公豬。動情素受體基因（Estrogen receptor, ESR）具有A與B兩種交替基因，文獻指出相較於AA基因型之母豬，BB基因型者會有較多的窩仔數，因此，B交替基因有利於窩仔數的表現。本試驗目的旨在將ESR基因之有利交替基因導入台灣杜洛克新品種。計畫執行先將帶有BB基因型之高畜黑公豬與帶有AA基因型之杜洛克母豬雜交產下雜交一代F1（D 50% × K 50%），緊接自雜交一代中選留黑色公豬與杜洛克母豬進行配種產下級進一代R1（D 75% × K 25%），再選留紅色級進一代公豬與杜洛克母豬雜交產下級進二代R2（D 87.5% × K 12.5%），並於試驗過程中調查經雜交與級進配種產下之後裔其毛色與ESR基因型的分佈。結果顯示，在毛色分布方面，紅色毛色在雜交一代、級進一代與級進二代所占比例分別為0、52.1及100%，顯示且高畜黑豬黑毛色與杜洛克母豬紅毛色基因有顯隱性關係；ESR基因型分布方面，AB基因型在雜交一代、級進一代及級進二代所占比例分別為100、54.7及70.5%。動情素受體基因選留已符合當初預期目標，試驗已選留帶有AB基因型之公、母級進二代，預計級進二代自交後即會產下帶有BB基因型之後裔，順利將有利之B交替基因導入台灣杜洛克品種。

關鍵語：台灣杜洛克、毛色、基因型頻率

SELECTION FOR NEW BREED OF TAIWAN DUROC PIG: COLOR PATTERN OF COAT AND GENOTYPIC FREQUENCIE

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The selection object for new breed of Taiwan Duroc was to develop high adaptability and reproductive performance boar by crossing and up-grading matting. Estrogen receptor (ESR) gene has two alleles, A and B. Literature indicated that BB homozygotic sows had more litter size than AA homozygote did. Thus, allele B of ESR gene is generally recognized as a favorable allele. The purpose of the present study was to introduce allele B into new breed of Taiwan Duroc. Thus, three phase of breeding scheme were carried out in this project. First, we used the KAPS black boars (BB homozygote) and Duroc sows (AA homozygote) to generate F1 progeny (D 50% × K 50%). Second, the black F1 boars were selected and mated with Duroc sows to generate R1 (D 75% × K 25%, DDK). Finally, the red R1 boars were selected and mated with Duroc sows to generate R2 (D 87.5% × K 12.5%, DDDK). In addition, the color pattern of coat and the ESR genotyping data were collected. The proportion of red coat color was 0, 52.1 and 100% in F1, R1 and R2, respectively. The results demonstrated that the black coat color was dominant and red coat color was recessive. Furthermore, as expected, the proportion of AB heterozygote was 100, 54.7 and 70.5% in F1, R1 and R2, respectively. The R2 progeny with AB heterozygote had been selected for further self matting. We expected that could successfully generate BB homozygotic progeny from R2 and introduce the favorable B allele into new breed of Taiwan Duroc.

Key Words: Taiwan Duroc, Coat color, Genotypic frequency

乳牛繁殖基因型對乳量乳質性狀表現之影響

73.乳牛繁殖基因型對乳量乳質性狀表現之影響

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台灣耐熱型乳牛選拔標準以DHI泌乳牛群資料庫進行，並應用乳樣DNA進行BLAD、CITL、CVM、DUMPS等四種繁殖基因型檢測。本研究選用2010年4至9月的熱期19,759頭泌乳牛資料，其中有六月次測乳的4,881頭並採用六月次之305-2X-ME乳量平均大於7,500Kg牛隻，計有933頭泌乳牛有繁殖基因型資料。所有933頭牛之CITL均為TC有利繁殖基因型與DUMPS均為TD有利繁殖基因型，而其他二種繁殖基因型(BLAD-CVM)分別為BL-CV (2頭)、BL-TV (22頭)、TL-CV (91頭)、TL-TV (818頭)等四類型，其乳量育種價平均分別為+469、+594、+502、+568 Kg；脂肪量育種價平均分別為-2.8、+16.9、+12.1、+17.9 Kg；脂肪率平均分別為3.068、3.695、3.608、3.704%；蛋白質率平均分別為3.066、3.267、3.255、3.292%；體細胞數平均分別為28.8、37.6、32.7、26.7萬個/mL；體細胞數最少值分別為13.5、5.8、8.0、7.6萬個/mL。結果顯示4至9月熱期產乳牛如為TL-TV有利繁殖基因型之牛隻，具有高乳量與高乳質性能表現。

關鍵語：乳牛、選育、基因

REPRODUCTIVE GENOTYPE INFLUENCE ON PERFORMANCE OF MILK YIELD AND QUALITY IN COW

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Selection of heat-tolerance milking cow in Taiwan is based upon the database of DHI. Cow milk DNA was used to identify the genotype of four reproductive genes such as BLAD, CITL, CVM and DUMPS. There were 19,759 head of milking cows tested on the period of April to September of 2010. A total of 4,881 head having month milk sampling of six and with a mean of 305-2X-ME milk yield greater than 7,500Kg but only 933 head having genotypes of reproductive gene of BLAD, CITL, CVM and DUMPS. All of 933 cows had favorable genotype of CITL-TC and DUMPS-TD. Cows with BLAD and CVM genotypes were classified into four groups as follows: BL-CV (n=2), BL-TV (n=22), TL-CV (n=91) and TL-TV (n=818). Four groups of BLAD-CVM genotypes had mean breeding value of 305-2X-ME milk yield with +469, +594, +502 and +568 Kg, respectively; mean breeding value of milk fat with -2.8, +16.9, +12.1 and +17.9 Kg; mean percentage of fat content with 3.068, 3.695, 3.608 and 3.704%; mean percentage of protein content with 3.066, 3.267, 3.255 and 3.292%; mean cell count of somatic cells with 28.8, 37.6, 32.7 and 26.7 x10,000 cells/mL; the lowest number of

somatic cell counts with 13.5, 5.8, 8.0 and 7.6 x10,000 cells/mL. Results indicated that cows having a favorable genotypes of TL-TV had production performance on higher milk yield and better milk quality during the hot period from April to September.

Key Words: Dairy cattle, Selection, Gene

黑山羊基因多樣性分析

88.黑山羊基因多樣性分析

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本研究之目的在於利用微衛星型遺傳標記探討黑山羊之基因多樣性。以9組微衛星型遺傳標記分析60頭行畜產試驗所花蓮種畜場之黑山羊DNA，結果顯示標記之交替基因數目介於2－9個，平均交替基因數為6.22±2.11，而觀測異質度(Ho)、期望異質度(He)及多態性資訊含量(PIC)則分別為0.53±0.02、0.59±0.06及0.55±0.18。在ETH10標記的分析中發現，所有山羊個體的基因型僅兩種，分別為198/198（10%）與208/208（90%），故Ho之數值為零，而其他8種標記分析所得之Ho與He幾乎不小於0.50。各標記除ETH10與ILSTS005外之PIC，均大於0.5，且各標記之平均PIC值亦大於0.5，故族群具有高度遺傳多態性資訊。

關鍵詞：黑山羊、微衛星型遺傳標記、基因多樣性。

GENETIC DIVERSITY OF BLACK GOATS EVALUATING BY MICROSATELLITE MARKERS

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The aim of this study was to investigate the genetic diversity of black goats using microsatellite genotyping. A total of nine microsatellite markers were used to genotype 60 black goats of Hualien propagation station, Livestock Research Institute. The allele number for all loci ranged between 2 to 9, and the mean allele number was 6.22±2.11. The mean values for observed heterozygosityg (Ho), expected heterozygosity (He), and polymorphism information content (PIC) were 0.53±0.02, 0.59±0.06 and 0.55±0.18, respectively. From the analysis of ETH10 marker, there were only two genotypes with 198/198 (10%) and 208/208 (90%) in the goat population. Therefore, Ho of this goat population was zero. The values of Ho and He deduced from other loci were almost no less than 0.5. PIC values obtained from the analyses of microsatellite markers except for ETH10 and ILSTS005 were larger than 0.5, and the mean values of all markers were also larger than 0.5, indicating that the genetic diversity of this goat population was high.

Key Words: Black goat, Microsatellite marker, Genetic diversity.

種豬腳蹄結構性狀之檢測

97.種豬腳蹄結構性狀之檢測

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腿蹄問題是種豬淘汰的三大主因之一，本試驗的目的是建立場內檢定豬隻前後肢腳結構及腿蹄線性評分方法。已完成七次共49頭台灣區種豬產業協會展示拍賣與六期共86頭財團法人中央畜產會中央檢定站完檢之藍瑞斯種公豬豬腳結構性狀的檢測。試驗先建立檢測線性評分表，評分總分100分，前肢評分包括前膝關節、前肢前觀、前肢繫部及蹄四部份，後肢包括飛節、後肢後觀、後肢繫部及蹄四部份，前肢佔40%、後肢60%。然後成立種公豬豬腳結構評分工作小組，由劉桂柱先生、林克育先生、顏念慈先生、陳佳萱小姐及吳連福先生擔任，每次評分工作由三位小組人員共同進行，包括由劉先生與林先生分別擔任主、副審。檢測結果可促進種豬業者對種豬腳蹄結構的重視，未來可成為種豬拍賣資訊的一部分。

關鍵語：豬、腳與腿、結構

EVALUATION OF FEET AND LEGS OF BREEDING PIGS

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Feet and legs problem is one of the three major reasons for culling breeding pigs. Evaluation of feet and legs need a scoring method and this study attempted to set up a scoring method for pig selection system of Taiwan. For setting the linear scoring method of front and rear feet-legs, a total of 49 Landrace boars of seven auctions from members of Formosan Farmers Association for Swine Improvement and 86 Landrace boars of six terms from the Central Performance Test Station of National Animal Industry Foundation were scored. At first, a scoring form was set up, 100 total points, including 40 points of front legs (knee, front-leg turning, pasterns and claws) and 60 points of rear legs (angle-hock joint, rear-leg turning, pasterns and claws). Then we organized the working team for scoring feet and legs in breeding pigs. The members are Mr. Liu Kuei Chu, Mr. Lin Ko Yu, Mr. Yen Nian Tsu, Miss Chen Chia Hsuan and Mr. Wu Lian Fu. Each time three representative team members will score for feet and legs of breeding pigs, and Mr. Liu Kuei Chu and Mr. Lin Ko Yu served as chief umpire and vice umpire respectively. The scoring results will promote the swine breeding industry to enforce the structure of pig's feet and legs, and the scored feet and legs data will join as one of the information in breeding pig auction in the future.

Key words: Swine, Feet and legs, Conformation

種豬與種土雞之產精能力之研究

98.種豬與種土雞之產精能力之研究

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由於我國種豬場與種土雞場，早已使用生長性能檢定、人工授精與產精基因等DNA鑑定技術來選育後裔，未來若能將產精能力併入現代種畜禽選種之架構，將可提昇畜禽生產性能檢定體系強化及建置並且減少因選留產精不良種畜禽所造成之損失。本研究目的乃藉由精子體能分析儀針對精子六項體能測定及一項精液性狀測定，完成每頭受測公猪至少建立1000至5000隻精子體能分佈圖型，來檢定高肉質公豬與土雞之產精能力，作為未來選留產精能力強的種公豬與種土雞之應用。試驗中分別將採得之新鮮種豬及種雞精液，分別予以稀釋成0.5×106 /ml分析濃度後，依各分析項目加入所需染劑後，於37°C培養數分鐘後，上機分析該樣品之活/死精子數、穿孔體及精子膜完整性、線粒體膜電位完整性與細胞凋亡比例、細胞內游離鈣水平的檢測、DNA染色質結構完整性、精子細胞內自由基及精漿細菌污染等分析後，初步結果顯示在建立精子體能分佈圖上大致符合分析儀對該品種設定之內部參數，但在不同種豬間（藍瑞斯、約克夏與杜洛克）及種雞（紅羽土雞）精子體能分佈圖，則存在品種及個體間差異，該差異是否受到品種特異性或飼養及環境外在因子之影響，則有待進一步分析與比較之。

關鍵語：公豬、公雞、精子分析、精子品質、細胞分選儀

THE STUDY OF SPERM PRODUCTION PERFORMANCE TEST IN BREEDING PIGS AND ROOSTERS

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In Taiwan, growth performance test, artificial insemination and reproductive gene typing are adopted as selection of progeny of breeding stocks in early of 1990s. Hence, further to establish an evaluation system on sperm capacity in high meat quality populations of breeding pig and chicken, it will be beneficial to having improvement of better prolificacy on semen production of breeding animal selection program and reduce the cost of keeping sterile male .The purpose of this study is to establish a technique for evaluation of sperm quality and evaluate at least 1000 to 5000 sperms of test breeding animals as predictors in young breeding animal for selection. First, the semen diluted to 0.5×106 /ml will be mixed with specific dye and incubate at 37°Cfor minutes, then analyze sperms with viability, acrosome and sperm membrane integrity, mitopotential, calcium level , chromatin structure,oxidation and bacterial count assay. The result shows that different indexes were found in different pig species and also in individual but same species. The criteria of this semen evaluation techniques may need further study.

Key words: boar, rooster, sperm analysis, sperm quality, flow cytometry

種雞生長性能及孵化率之場內檢定

99.種雞生長性能及孵化率之場內檢定

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為協助土雞業者建立種雞生長性能及種蛋孵化率之場內檢定技術，提昇台灣土雞生產效益。結合行政院農業委員會畜產試驗所創新育成中心進駐之土雞種雞場，進行土雞公雞與母雞上市前1週齡體重場內檢測，以及種母雞32至37周齡進行人工授精之個體種蛋之孵化率（出雛數/入孵蛋數）檢定。該場紅羽土雞G1世代雞隻8週齡平均體重公母分別為1822±220公克與1507±168公克(平均±標準偏差)，紅羽土雞G1世代種雞孵化率為73.1±28.7%(平均±標準偏差)，在各品系間有顯著差異(P
關鍵語：種雞、生長性能、場內檢定

ON FARM TEST FOR GROWTH PERFORMANCE AND HATCHING RATE IN NATIVE CHICKEN BREEDING FLOCK

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In order to help native chicken breeding farms to establish the techniques of on farm test for growth performance and hatching rate in their breeding flock. Cooperating with those of native chicken breeding farms under the program of the Innovation Incubator Center of Livestock Research Institute, we proceeded on farm test. Body weight of red feather native chicken was measured before one week of marketing age. Records of hatching rate (chick number/egg number of hatchery) of individual hen will collected from 32~37 week of age. Body weight at 8-week-age in male and female native chickens were 1822 ± 220 g and 1507 ± 168 g (mean ± SD), respectively. Their hatching rate is 73.1±28.7 %(mean ± SD). There is significant difference in hatching rate among six lines of this flock (P
Key Words: Breeding Chicken, Growth Performance, On Farm Test

雞隻泌乳素基因與藾菭性之關聯性探討

106.雞隻泌乳素基因與藾菭性之關聯性探討

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藾菭性是造成雞隻產蛋數低落的重要因素之一。本試驗利用畜試土雞近親品系9與來亨雞進行正反雜交產生雜交一代雞隻，雜交一代雞隻進行全同胞配種產生雜交二代雞隻，以建立參考族群。採集參考族群雞隻血樣萃取DNA，進行泌乳素基因(Prl)基因型檢測，並結合母雞藾菭記錄進行關聯性分析。畜試土雞近親品系9 雞隻Prl基因型頻率MM、MN及NN分別為33.3%、36.4%及30.3%，而來亨雞皆為NN基因型，顯示在畜試土雞近親品系9與來亨雞品系P間的Prl基因型頻率存在顯著的關聯性 (P
關鍵語：雞、藾菭性、泌乳素基因

ASSOCIATION STUDY OF CHICKEN PROLACTIN GENE AND BROODINESS

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Chicken broodiness is considered as one of the major factors that decrease the potential of egg production. In order to set up a F2 design reference family for mapping of broodiness, the F1 hybrid progenies was produced by reciprocal crosses between LRI native chicken inbred line 9(LRI-L9) and Leghorn, and F2 progenies was produced by fullsib mating of F1. Records of genotyping of DNA extracted from blood merged with broody records was used to explore the association between broodiness and genotype. Prl of PCR-SSCP has three genotypes. The genotype frequency of MM, MN and NN in LRI-L9 were 33.3%, 36.4% and 30.3%, respectively. But, all leghorns were NN type in the collected samples. The GO data showed a strong association between breed and genotype (P
Key Words: Chicken, Broodiness, Prolactin gene

雞隻動情素接受體基因與母雞早熟性之關聯性探討

107.雞隻動情素接受體基因與母雞早熟性之關聯性探討

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本試驗利用畜試土雞近親品系9與來亨雞進行正反雜交產生雜交一代雞隻，雜交一代雞隻進行全同胞配種產生雜交二代雞隻，以建立參考族群。採集參考族群雞隻血樣萃取DNA，進行動情素接受體基因(ESR)基因型檢測，並結合母雞產第1個蛋之日齡記錄進行關聯性分析。畜試土雞近親品系9 雞隻ESR基因型頻率EE、EF及FF分別為0%、3.0%及97.0%，而來亨雞則分別為61.1%、33.3%及5.6%，顯示在畜試土雞近親品系9與來亨雞品系P間的ESR基因型頻率存在品種間顯著的關聯性 (P
關鍵語：雞、早熟性、動情素接受體基因

ASSOCIATION STUDY OF CHICKEN ESTROGEN RECEPTOR GENE AND EARLY MATURITY IN HEN

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F2 design reference family was set up a for chicken gene mapping, the F1 hybrid progenies was produced by reciprocal crosses between LRI native chicken inbred line 9(LRI-L9) and Leghorn, and F2 progenies was produced by fullsib mating of F1. Records of genotyping of DNA extracted from blood merged with the age at first egg (AFE) records was used to explore the association between maturity and genotype of estrogen receptor (ESR). Three genotypes (EE, EF and FF) of ESR were detected by PCR-SSCP. The genotype frequency of EE, EF and FF were 0%, 3.0% and 97.0% in LRI-L9, and 61.1%,33.3% and 5.6% in white Leghorn,

respectively. The GO data showed a strong association between breed and genotype (P
Key Words: Chicken, Maturity, Estrogen receptor gene