第四十二卷(2013)

登錄種豬之基因多樣性分析

日期2014/3/6 14:29:26

登錄種豬之基因多樣性分析

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畜養動物基因多樣性的保護，為第 10 屆生物多樣性締約國會議所訂定愛知目標重要的標題目標之一。本研究應用 18 組豬之微衛星型遺傳標記，分別分析 90 個藍瑞斯、60 個約克夏及 90 個杜洛 克品種豬的 DNA 樣品，經分析後得知 4 種參數，其交替基因數、期望異質度、觀測異質度及多態 性訊息量範圍分別為 4－12、4－8、3－8；0.184－0.834、0.089－0.789、0.171－0.812；0.528－0.799、0.339－ 0.817、0.422－0.761；0.399－0.757、0.163－0.722、0.435－0.711，而其平均值則分別為 7.0、6.2、5.8；0.661、0.678、0.594；0.601、0.621、0.533；0.614、0.627、0.530。因此，三個品種豬的平均 PIC 值均大於 0.50，尤以約克夏豬的 PIC 值最大，此結果表示族群具有高度遺傳多態性資訊。

關鍵語：種豬、微衛星型遺傳標記、基因多樣性

EVALUATING GENETIC DIVERSITY OF REGISTERED BREEDING PIGS BY MICROSATELLITE MARKERS

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The genetic diversity protection of domesticated animals is one of the important targets of Aichi Biodiversity Targets adopted by the Tenth Meeting of the Conference of the Parties (COP10) to the Convention on Biological Diversity. A total of 240 pigs including 90 Landrace pigs, 60 Yorkshire pigs, and 90 Duroc pigs were genotyped using 18 microsatellite markers. In this study, the values of allele number, expected heterozygosity (He), observed heterozygosity (Ho), and polymorphism information content (PIC) ranged from 4－12, 4－8, and 3－8, 0.184－0.834, 0.089－0.789, and 0.171－0.812, 0.528－0.799, 0.339－0.817, and 0.422－0.761, and 0.399－0.757, 0.163－0.722, and 0.435－0.711 for Landrace (L), Yorkshire (Y), and Duroc (D), respectively. Moreover, the average values of He, Ho, and PIC were 7.0, 6.2, and 5.8, 0.661, 0.678, and 0.594, 0.601, 0.621, and 0.533, and 0.614, 0.627, and 0.530 for L, Y, and D, espectively. Therefore, the average PIC values of three pig breeds were larger than 0.5. Particularly, the PIC of Duroc pigs was the largest among three breeds of pigs. The results indicated that the pig population possesses high genetic diversity.

Key Words: Breeding pig, Microsatellite marker, Genetic diversity

乳牛脊椎畸形複合症檢測法之開發

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脊椎畸形複合症(CVM)為一種單基因隱性遺傳疾病，在 2000 年首度發現於丹麥，此種遺傳缺陷常 見於荷蘭種乳牛。目前常用的檢測方法有對偶基因專一 PCR 法(AS-PCR)與引子引入限制酶切點 PCR 法(PCR-PIRA)。本研究嘗試開發三種不同的檢測法，用以篩檢乳牛族群之 CVM 基因型。第 一種為 DNA 定序法，在基因序列中設計適當引子，使 PCR 產物包含 CVM 變異點，將 PCR 產物 純化後，進行定序以判斷其基因型。第二種為設計適當引子對，使 PCR 產物包含變異點，以定量 PCR 進行基因型檢測。第三種則為應用 MS-PCR 的方式設計三種引子，將正常型設計成長為 110 bp， 突變型設計長為之 130 bp 片段，經由簡易之 PCR 機器與膠體電泳即可進行基因型判別。以上三種方式皆可成功檢測 CVM 基因型，但若考量檢測成本時，則以 MS-PCR 法最為可行。

關鍵語：乳牛、脊椎畸形複合症、檢測

DEVELOPMENT OF IDENTIFICATION METHODS FOR BOVINE COMPLEX VERTEBRAL MALFORMATION

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Complex vertebral malformation (CVM) is a monogenic recessive genetic disorder which was first discovered in Denmark in 2000. Currently, two assay methods including allele-specific polymerase chain reaction (ASPCR) and polymerase chain reaction–primer introduced restriction analysis (PCR-PIRA) are used to identify CVM. In this study, we tried to develop three assay methods to identify CVM. First, DNA sequencing for the amplified DNA fragment covered CVM variation site was employed to genotype CVM. Second, the DNA fragment covered CVM variation site was amplified by specific primers and examined by real-time PCR. Third, a MS-PCR based method was invented to genotype CVM. A 110-bp PCR fragment represents normal type; a 130-bp PCR fragment represents mutant type. Moreover, a carrier contains 110-bp and 130-bp PCR fragments simultaneously. The CVM genotype were able to be identified well by those three methods mentioned above. However, it is recommended to use MS-PCR method to detect CVM based on cost effectiveness.

Key Words: Dairy cow, Complex vertebral malformation, Identification

以微衛星型遺傳標記評估乳牛基因多樣性

以微衛星型遺傳標記評估乳牛基因多樣性

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畜養動物基因多樣性的保護，為第 10 屆生物多樣性締約國會議所訂定愛知目標重要的標題目標之一。本研究以 13 組微衛星型遺傳標記分析 144 頭乳牛之基因多樣性，結果顯示標記之交替基因數目介於 4－12 個，整體標記之平均交替基因數目為6.5。在 13 種標記的分析中，僅有 3 種標記所得之多態性訊息量小於 0.50。整體分 析所得之期望異質度、觀測異質度及多態性訊息量範圍分別為 0.374－0.817、0400－ 0.889 及 0.303－0.793，而其平均值則分別為 0.657、0.658 及 0.607。綜而言之，本 次研究所得乳牛族群之平均多態性訊息量大於 0.50，此結果顯示族群具有高度之 基因多樣性。

關鍵語：乳牛、愛知生物多樣性目標、基因多樣性。

EVALUATION OF GENETIC DIVERSITY OF DAIRY COWS BY MICROSATELLITE MARKERS

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The genetic diversity protection of domesticated animals is one of the important targets of Aichi Biodiversity Targets adopted by the Tenth Meeting of the Conference of the Parties (COP10) to the Convention on Biological Diversity. The genetic diversity was evaluated using 13 microsatellite markers to genotype 144 bovine DNA samples. The results indicated that the polymorphism information content from 3 markers was below 0.5. In this study, the values of expected heterozygosity (He), observed heterozygosity (Ho), and polymorphism information content (PIC) ranged from 0.374－0.817, 0400－ 0.889, and 0.303－0.793, respectively. Moreover, the average values of He, Ho, and PIC were 0.657, 0.658, 0.607, respectively. Based on the results shown above, the cattle population possesses high genetic diversity.

Key Words: Dairy cow, Aichi Biodiversity Targets, Genetic diversity

乳牛短脊椎綜合症基因頻率分析

乳牛短脊椎綜合症基因頻率分析

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牛短脊椎綜合症為一種隱性遺傳疾病，於 2006 年時首度在丹麥被發現。本症狀形 成的原因為在牛第 21 號染色體上的 FANCI 基因有 3.3 kb 片段的缺失。本研究自兩 家民間乳牛場分別收集 32 頭與 112 頭乳牛血液樣品。經基因篩檢後，在 A 場發現 有 2 個樣品之基因型為雜合型，在 B 場則發現有 6 個樣品之基因型為雜合型，其 雜合型之頻率為 5.6%。此結果低於荷蘭(7.4%)與美國(6%)的研究報告，但高於中 國(3.8%)的研究報告。由於短脊椎綜合症會造成酪農產業的損失，實有必要進行大 規模的乳牛族群篩檢，並以選擇配種的方式，逐步篩除此一不良的基因。

關鍵語：短脊椎綜合症、乳牛、FANCI 基因

FREQUENCY OF BRACHISPINA SYNDROME OF DAIRY COWS

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Bovine brachyspina syndrome (BS) is a recessive genetic defect first observed in Denmark in 2006. The syndrome is caused by a 3.3-kb DNA deletion in the bovine Fanconi anemia complementation group I (FANCI) gene on bovine chromosome 21. In this study, a total of 144 dairy cow samples including 32 samples from A farm and 112 samples from B farm were examined. The result indicated that 2 carriers were from A farm and 6 carriers were from B farm. The frequency of BS carriers in this study was 5.6% which was lower than that reported in the Netherlands (7.4%) and the United States (6%) but was higher than that in Mainland China (3.8%). The dairy industry has huge losses due to brachyspina syndrome. The genetic defect should be eliminated gradually by large scale genotyping and selective mating.

Key Words: Brachyspina syndrome, Dairy cow, FANCI gene

台灣杜洛克豬體型性狀

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本試驗旨在收集台灣杜洛克豬新品種體型性狀，藉以了解公豬與母豬體型差異。台灣杜洛克豬血統組成是高畜黑豬與杜洛克雜交，經過4代級進育種而成。高畜黑豬血統組成乃是由50%杜洛克與50%梅山豬級進而成，因此台灣杜洛克代豬已具有93.75%杜洛克與6.25%梅山豬，足以定調為台灣杜洛克新品種。調查台灣杜洛克豬R4與R5代147 ± 3天完檢豬隻平均體型性狀，公母體型分別為平均體重96.77 ± 11.35與 90.40 ± 6.45公斤；體高59.59 ± 6.90與 55.75 ± 4.70公分；體長108.75 ± 5.31與109 ± 4.78公分；胸圍103.88 ± 6.38與 103 ± 4.60公分；管圍19.44 ± 1.03與 18.50 ± 1.08公分；

後幅32.02 ± 2.76與 31.35 ± 2.40公分; 前幅33.78 ± 2.66與 31.55 ± 2.29公分; 胸深33.62 ± 1.76與 33.9 ± 2.58公分; 三點背脂厚度1.92 ± 0.30與 1.94 ± 0.28公分。母豬除體長較長之外, 其餘性狀皆以公豬較大。

關鍵詞：體高、體型、台灣杜洛克

BODY CONFORMATION TRAITS IN TAIWAN DUROC

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The purpose of this study was to investigate the difference in body conformation traits between boars and sows of new breed Taiwan Duroc by the collected body conformation traits. A new Taiwan Duroc (Duroc 93.75% × Meishan 6.25%) was developed by crossing KHAPS boars (Duroc 50% × Meishan 50%) with Duroc sows according to the upgrading breeding program. The average body weight, body height, body length, breast circle, foot circle, back width, front width, breast depth, backfat thickness of new Taiwan Duroc at 147 ± 3 day-olds of age were 96.77 ± 11.35 kg, 59.59 ± 6.90 cm, 108.75 ± 5.31 cm, 103.88 ± 6.38 cm, 19.44 ± 1.03 cm, 32.02 ± 2.76 cm, 33.78 ± 2.66 cm, 33.62 ± 1.76 cm, and 1.92 ± 0.30 cm in boars; 90.40 ± 6.45 kg, 55.75 ± 4.70 cm, 109 ± 4.78 cm, 103 ± 4.60 cm, 18.50 ± 1.08 cm, 31.35 ± 2.40 cm, 31.55 ± 2.29 cm, 33.9 ± 2.58 cm and1.94 ± 0.28 cm in sows, respectively. These data showed that all body conformation traits in boars were larger than sows in the new Taiwan Duroc except for the body length.

Key Words: Body height, Body conformation traits, Taiwan Duroc

畜產試驗所台灣水鹿微衛星遺傳標記多樣性分析

畜產試驗所台灣水鹿微衛星遺傳標記多樣性分析

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台灣水鹿是台灣最大型的野生草食動物, 並被馴養為畜產動物已超過一百年。行政院農業委員會畜產試驗所高雄種畜繁殖場自1984年起開始建立台灣水鹿族群, 為建立該族群之遺傳多樣性資訊, 本試驗利用11組微衛星標記分析該族群126頭台灣水鹿個體之DNA, 所有11組微衛星標記皆有多態型的基因型, 共檢測到83個alleles, 平均每個基因座具有7.5個對偶基因(3~17個alleles), 其觀測異質度介於0.04到0.63, 平均為0.33 ± 0.18, 期望異質度介於0.12到0.78, 平均為0.64 ± 0.20, 而多態性訊息含量平均為0.60 ± 0.20。在本試驗選用的11組微衛星標記組皆有多態型的基因型, 除NVHRT73微衞星標記之多態性訊息含量為低多態性資訊 (PIC
關鍵語：台灣水鹿、遺傳多樣性、微衞星標記

GENETIC DIVERSITY ANALYSIS OF FORMOSAN SAMBAR IN LRI-COA BY MICROSATELLITE MARKERS

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Formosan Sambar is a one of sambar deer subspecies exclusively found in Taiwan. It is also the largest native herbivore of the island and has been raised as farm animal more than one hundred years. The Deer population was established in Kaohsiung Animal Propagation Station since 1984. In order to construct the information of genetic diversity of this population, we use a set of 11 microsatellite markers to analyze 126 individuals from this herd. All of the microsatellites were polymorphic with average allelic number 7.5, ranged from 3 to 17 per locus. There were 83 alleles detected in total. The observed heterozygosity of the population ranged from 0.04 to 0.63, and the average observed heterozygosity was 0.33±0.18(mean±SD). The expected heterozygosity ranged from 0.12 to 0.78, and the average expected heterozygosity was 0.64±0.20. The estimated average polymorphic information content (PIC) was 0.60± 020. Except NVHRT73 marker was slightly informative (PIC PIC > 0.25), others of the microsatellite markers were highly informative highly informative (PIC > 0.50). Our result indicated that the geneticists have paid more attention in keeping genetic diversity of the Formosan Sambar herd.

Key Words: Formosan Sambar, Genetic diversity, Microsatellite marker

單晶片微電腦無線射頻動物重量紀錄系統

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重量的量測是動物飼育過程中一項重要的項目，若需同時管理大量的動物，則可配合RFID動物標籤來執行。然而，RFID動物標籤難以由人眼直接判讀，且整合RFID標籤資料與重量、時間等資料的過程繁雜。因此建構一套快速、簡單的RFID動物重量管理系統是必須的。本系統以單晶片微電腦Arduino為核心，使用通用串列匯流排USB供電，透過荷重元Load Cell獲得重量，由RTC取得時間，並利用藍芽模組與RFID Reader連線。Arduino 先將Reader傳來的資料解碼，再將RFID Tag、重量、日期與時間等資料整合，最後顯示於液晶顯示器上並儲存於SD卡中。使用者取得SD卡資料後，可透過電腦端動物重量管理系統，儲存至料庫，或上傳至雲端。透過本系統，現場量測與紀錄動物重量時，不需攜帶電腦與紙筆，也不用尋找插座，輕巧方便。手持機與磅秤透過藍芽連線，沒有傳輸線的阻礙，可隨意移動，找尋Reader最佳的讀取位置。本系統徹底改善了傳統人工紀錄的缺點，有效提升動物管理者的工作效率。

關鍵語：無線射頻辨識、單晶片、藍芽

AN ARDUINO ANIMAL WEIGHING SYSTEM WITH RADIO FREQUENCY IDENTIFICATION

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Weight measurement is an important process in animal breeding. Radio Frequency Identification, RFID, tags can reduce the mistakes in identifying animals. However, RFID animal tags is not easy interpreted directly by the human eyes, and the integration of tag information with time and weight data need further computing process. Therefore, to construct a fast and simple RFID animal weight management system is important. The system is a single-chip microcomputer, Arduino, powered by Serial Bus (USB). Weight data is calculated from Load Cell, time is catch by Real-time clock, RTC and bluetooth modules supporting RFID Reader connection. Arduino first decode the data coming from the Reader and integration with weight, date and time data, and finally displayed on the LCD monitor and stored in the SD card. Users can use the SD card directly via computer, or save it into remote cloud database. Through this system, researchers can carry out field animal weight measurements without desktop or notebook computer. USB Arduino integrates RFID handset with wireless Bluetooth scale. There is no obstacle transmission line, free to move, and easy to find the best position for reading tags. The system can provide a better alternative to hand weight recording and increase the efficiency of animal management.

Key words: Radio frequency identification, Arduino, Bluetooth

球蟲感染之土雞盲腸內容物中微生物多源基因體研究

球蟲感染之土雞盲腸內容物中微生物多源基因體研究

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雞球蟲病是造成養雞產業相當大損失的重要疾病之一。主要是造成雞隻腸道上皮細胞中度至嚴重損壞，導致增重與飼料效率降低，並經常引發雞群高的發病率和死亡率。本試驗應用Illumina MiSeq system 分析球蟲對於土雞盲腸內微生物菌相的影響。DNA樣品取自雞隻盲腸有球蟲感染與沒有受到球蟲感染的盲腸內容物。以16S rRNA共通的引子組與Illumina MiSeq system 定序分析獲得每個樣品組大量的細菌類群的DNA片段定量型材(quantitative profiles)。採用分層聚類和主成分分析已鑑定出的類群的相對百分比豐度。在盲腸沒有球蟲感染的雞隻盲腸內容物的微生物菌相中，以擬桿菌屬(Bacteroides)最豐富，其次分別為牛黄瘤胃球菌屬(Ruminococcus)、Alistipes及梭孢桿菌屬(Clostridium)。而在盲腸有球蟲感染的雞隻盲腸內容物的微生物菌相中，則以Clostridium最豐富，其次分別為Bacteroides及Alistipes。球蟲感染明顯地影響雞隻盲腸與泄殖腔內微生物菌相的分布與豐度。本研究所呈現球蟲感染對雞腸道菌群的影響，可作為雞隻球蟲病防治的重要參考資訊。

關鍵語：土雞、球蟲、微生物、多源基因體、盲腸

THE METAGENOMICS OF MICROBIOME IN CECAL CONTENTS OF COCCIDIAN INFECTED NATIVE CHICKEN

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Coccidiosis, one of the most important chicken diseases, causes considerable economic loss in the chicken industry. Coccidiosis causes serious mucosal damage and predisposes chickens to enteropathogen infection. In this study, Illumina sequencing approach was used to evaluate effects of coccidiosis on the intestinal microflora of native chicken. Total DNA was isolated from the cecal contents of infected and uninfected birds, respectively, PCR amplified with an universal 16S rRNA barcodes, and sequenced by Illumina MiSeq. Quantitative profiles of bacterial taxa were obtained using an analysis pipeline written in Perl. The relative abundance of the identified taxa was analyzed using hierarchical clustering and principal component analysis. Samples from the cecal contents of uninfected chickens were dominated by bacterial species belonging to the genera Bacteroides, Ruminococcus, Alistipes and Clostridium; cecal contents of infected samples were dominated by species from the genera Clostridium, Bacteroides and Alistipes. Coccidia infection affects not only the richness of the microbial communities but also its composition in the cecum. These results prove the coccidia influence on the microbial communities of chicken gut and provide important information for the prevention and cure of chicken coccidiosis.

Key Words: Native chicken, Coccidian, Microbiome, Metagenomics, Cecum

抗凍劑及降溫速率對土雞冷凍精液品質之影響

抗凍劑及降溫速率對土雞冷凍精液品質之影響

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製作冷凍精液之過程中，諸多因素對解凍後精液之受精能力影響甚密，如稀釋液種類、抗凍劑種類、保存方式、冷凍與解凍速率及解凍後對有害物質（如甘油）之移除等。目前普遍使用於家禽冷凍精液製作之方法組合包括以不同抗凍劑（甘油/DMA/DMSO）、保存方式（粒狀/安瓶/麥管）、降溫速率（快速/慢速）等，相關研究指出對家禽精液而言，以甘油/慢速降溫/麥管或DMA/快速降溫/粒狀之組合模式可提升解凍後精液各項性能表現。然以維護生物多樣性種原保存觀點而言，必須考量種原庫之生物安全性及身分辨識準確度，前者仍是較為理想之方法，惟目前尚未了解甘油對母禽生殖道不孕現象之作用機制，以甘油抗凍處理之解凍後精子性能表現雖優異，卻導致極不理想的受精率結果。故本試驗之目的為以不同濃度之DMA及DMSO取代甘油抗凍劑，並比較在不同降溫速率條件之下其對土雞精子細胞膜完整性、頭帽完整性、粒線體膜電位完整性及細胞膜脂質完整性等各項精子性能指標之差異，以作為修正土雞冷凍精液製作之參考依據。

關鍵語：土雞、頭帽完整性、粒線體膜電位

COMPARISONS OF DIFFERNET CRYOPROTECTANTS AND FREEZING RATES ON CHICKEN SEMEN CRYOPRESERVATION

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There are many related factors could affect the results of semen cryopreservation, such as the different cryoprotectants, packagings, freezing and thawing rates. Several studies showed that the best performances of chicken thawing semen obtained from semen frozen by using glycerol/straws/slowly or dimethyl acetamide (DMA)/pellet/rapidly freezing methods. Nevertheless, considering about cryobanking, which demands high level of biosecurity and accurate identification, the former method is still the most effective way to preserve avian semen. However, the mechanism of glycerol which causes the contraception to females is still unclear. Even glycerol-exposed semen remains very good quality after thawing, but it always leads to terrible fertility rates. Hence, the purpose of this study was to use different levels of DMA and DMSO to replace glycerol cryoprotectant, and then freezing semen with different rates to evaluate the membrane integrity, acrosome membrane integrity, mitochondrial function and membrane phospholipid function of chicken thawing semen. The result index could be the useful reference to modify the methods of chicken semen cryopreservation in the future.

Key Words: Native chicken, Acrosome integrity, Mitochondria integrity

種豬體型優異群之腳蹄評鑑及其雄親效應

種豬體型優異群之腳蹄評鑑及其雄親效應

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腳蹄問題是種豬淘汰的三大主因之一。本調查目的為應用腳蹄結構評分方法，針對台灣三個品種(藍瑞斯、約克夏及杜洛克)種豬腳蹄結構進行檢測，並統計腳蹄第一名獎頭數與種豬腳蹄評鑑第一、二名獎者之雄親。從 2010年3月3日至 2013年10月15日止，共完成27次共438頭台灣區種豬產業協會展示拍賣之種豬及21期共376頭財團法人中央畜產會中央檢定站完檢之種豬之豬腳結構性狀的檢測。每次之評分經由種公豬豬腳結構評分工作小組三位成員共同進行，包括由劉桂柱與林克育分別擔任主、副審。評分總分為100分，前肢佔40%、後肢佔60%，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。腳蹄結構檢測結果，腳蹄第一名獎頭數共185頭，入選腳蹄第一名總頭數在10頭(含)以上之種豬場有六場，第一名獎總頭數前三名者分別占41.62% (77/185)、10,27% (19/185)及6.49% (12/185)，顯示場主對種豬腳蹄結構的重視。其子代公、母在種豬產業協會與中央畜產會腳蹄評分都得第一、二名獎者之雄親，在藍瑞斯占14.86% (11/74)、約克夏占16.67%(4/24)及杜洛克占1.19%(1/84)，綜合顯示，腳蹄線性評分資料已成為種豬拍賣資訊

的一部分。

關鍵語：種猪、雄親效應、腳蹄評鑑

PIG HOOF EVALUATION ON ELITE CONFORMATION OF PUREBREDS AND ITS PATERNAL EFFECT

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Feet and legs problem is one of the three major reasons for culling breeding pigs. The purpose of this investigation was to apply a scoring method for evaluating feet and legs of purebreds from three breeds (Landrace, Yorkshire and Duroc) in Taiwan, and to count the number of purebreds with the top grade of feet and legs, and male parent of purebreds from the first, second grade of feet and legs. From March 3, 2010 to October 15, 2013, a total of 438 purebreds of 27 auctions from members of Formosan Farmers Association for Swine Improvement and 376 purebreds of 21 terms from the Central Performance Test Station of National Animal Industry Foundation were scored. Each evaluation was carried out by three representative team members of the working team to score the feet and legs in breeding pigs. The member of Mr. Liu Kuei Chu and Mr. Lin Ko Yu served as chief umpire and vice umpire respectively. Total score was 100 points. Fore Leg which including four parts, angle at the knee joint, legs turning, condition of the pasterns and size and uniformity of claws was 40 points. Hind leg which including four parts, angle at the hock joint, legs turning, condition of the pasterns and size and uniformity of claws was 60 points. The scoring results indicated that the number of breeding pigs with the top grade of feet and legs were 185 heads. There were six swine stock farms which with up 9 heads of breeding pigs with the top grade of feet and legs. The percentage of the top three accounted for total number of breeding pigs with the top grade of feet and legs were 41.62% (77/185), 10,27% (19/185) and 6.49% (12/185), respectively, It showed the scoring method has induced the swine breeding farmer to enforce the structure of pig's feet and legs. The percentage of male parents which their offspring of male and female with the first and second grade of feet and legs at two auction units, Formosan Farmers Association for Swine Improvement and the Central Performance Test Station of National Animal Industry Foundation, in Landrace, Yorkshire and Duroc were 14.86% (11/74), 16.67%(4/24) and 1.19%(1/84), respectively. In summary, the scoring of feet and legs data has become one of the auction information in purebreds.

Key words: Purebred, Paternal effect, Pig hoof evaluation

乳牛初產月齡提早趨勢

乳牛初產月齡提早趨勢

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本研究依泌乳牛分娩年統計各初產月齡之頭數百分比，作為選育初產月齡早的耐熱型乳牛。本研究自www.angrin.tlri.gov.tw資料庫選取2001年1月至2013年9月間DHI乳牛產犢月齡記錄，進行乳牛初產月齡及其乳量乳質研究。於2002年有5,900頭初產母牛，初產月齡為24、27或30月齡以內的頭數百分比分別有10%、34%或69%；於2012年有4,969頭初產母牛，初產月齡為24、27或30月齡以內的頭數百分比分別有25%、60%或81%；近十年來，兩歲齡前產犢的初產母牛頭數百分比已增加2.5倍。2012年有180,957個乳樣記錄，年平均單日乳產量、乳脂肪率(F)、蛋白質率(P)、乳糖率、體細胞數、尿素氮、枸櫞酸、以及P/F比值分別有23.36Kg、3.82%、3.24%、4.79%、34萬細胞/mL、11.0mg/dL、191mg/dL、以及0.87。當與2002年的220,193乳樣之年平均單日乳產量(21.77Kg)、乳脂肪率(3.73%)、蛋白質率(3.22%)、P/F比(0.89)、乳糖率(4.78%)及體細胞數平均35萬細胞/mL來比較，提早初產月齡後之單日乳量也提高，而乳脂肪率及蛋白質率未受影響，但體細胞數有減少，顯示已能選育適應濕熱環境且初產月齡提早到24月齡以內之乳牛品系。

關鍵語：乳牛、選育、乳質

TREND IN AGE AT FIRST CALVING BY YEAR FOR DAIRY CATTLE

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Lactation records from the national dairy database at www.angrin.tlri.gov.tw were used to determine calving ages across time. Data were used to study on trend in age at first calving from January of 2001 to September of 2013. Cows calving in 2002, their age of first calving within 24, 27 or 30 months were 10%, 34% or 69% of 5,900 cows, respectively; as calving in 2012, there were 25%, 60% or 81% of 4,969 cows. There were 2.5 times of increase on percentage of first calving within 24 months in last 10 years. In 2012, daily milk yield, milk fat (F), protein (P), lactose, somatic cell counts, urea nitrogen, citric acid and P/F ratio from 180,957 milk samples had yearly mean of 23.36Kg, 3.82%, 3.24%, 4.79%, 340x103/mL, 11.0mg/dL, 191mg/dL, and 0.87, respectively, as comparison to the average of 220,193 milk samples in 2002 having 21.77Kg daily milk yield, 3.73% fat, 3.22% protein, 0.89 of P/F ratio, 4.78% lactose and 350x103/mL cell counts in 2002. It indicated that cows reducing the age of first calving did not had a significantly less fat% and protein% in milk along with a less somatic cell counts and a higher daily milk yield. In conclusion, trend in age at first calving with 24 months old was observed and a line of heat-tolerance of dairy cattle was selected.

Key Words: Dairy cattle, Selection, Milk quality

台灣杜洛克豬與其雜交肉豬肉質性狀評估

台灣杜洛克豬與其雜交肉豬肉質性狀評估

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本試驗目的旨在調查台灣杜洛克與其LR雜交肉豬 (L♀ × R♂)背最長肌理化特性，藉以了解台灣杜洛克新品種豬未來屠肉加工特色與應用方向。本試驗共屠宰台灣杜洛克豬 (R) 19頭 (閹公豬10頭與女豬9頭)與其LR雜交肉豬 25頭 (閹公豬16頭與女豬9頭)，豬隻屠宰後分切成三大部分，分肩部、腰脊部與後腿，各部位依瘦肉、脂肪與骨骼分別秤重，估算其屠體性狀，並取回背最長肌做為供試樣肉。試驗調查豬肉背最長肌之一般分析 (水分、灰分、粗蛋白質、粗脂肪)、 肉色L，a，b值、物理分析 (滴水失重、保水性、蒸煮失重、截切值與硬度)與感官品評 (香氣、風味、顏色、咬感與總接受度)。試驗結果顯示，LR雜交肉豬在灰分、粗蛋白質與滴水失重皆顯著比台灣杜洛克高 (P
關鍵語：雜交、肉質性狀、台灣杜洛克

EVALUATION ON THE MEAT TRAITS OF TAIWAN DUROC AND ITS HYBRID PIGS

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The purpose of this study was to investigate the physical and chemical characteristics of Longissimus dorsi in Taiwan Duroc and its hybrids LR (L ♀ × R ♂) for understanding the carcass traits and creating appropriate processing ways in the future. The experiment including 19 Taiwan Duroc (10 barrows and 9 gilts) and 25 hybrids (16 barrows and 9 gilts), after slaughtered and carcasses cut into three parts, including shoulder, belly and hams. Taken some Longissimus dorsi samples back for weighting lean meat, fat and bone content and estimating carcasses traits. Proximate analysis (moisture, ash, crude protein and crude fat), meat colored (L, a, b value), physical analysis (drip loss, water holding capacity, cooking loss, shear force and hardness) and sensory evaluation (aroma, flavor , color, chewiness and acceptance) were evaluated. The results showed that LR pigs had higher ash, crude protein and drip loss than those of Taiwan Duroc (P
Key Words: Hybrids, Meat traits, Taiwan Duroc