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**乳牛一年一胎的頻率**

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乳牛一年一胎的頻率

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台灣乳牛群改良計劃於近10年間(1995－2004)，每胎泌乳天數平均分別為346(n=9491頭)、351(9991)、352(9435)、350(9962)、360(13709)、347(14891)、342(15301)、348(17493)、356(20051)、352(12747)天；乾乳年齡平均分別為5.21、5.29、5.29、5.33、5.25、5.22、5.17、5.09、5.06、5.11年；各年度的泌乳天數平均達350天之久，暗示要一年一胎的的機會不高。不過，具完整系譜3760頭經產牛於2003年11月至2004年4月間分娩，胎距平均最少的第一名330天、前100名的337天，平均胎距為450天；顯示仍有2%以上(100/3760)的乳牛可由胎距450天縮短為337天，具有一年一胎的能力。胎距平均前100名的經產牛有4胎以上(包括4胎)的頭數有22%，也有一頭(ID10016417；29H4397公牛的女兒牛)是10胎，胎距平均為335天。利用近七年的分娩資料，把五歲齡之前就有三胎記錄的經產牛14,866頭，計算個別牛的胎距並由少至多排序，胎距平均為365天以內的牛頭數佔27.4%(4074/14866)。乳牛繁殖的六大地區，年產一胎的頻率在彰化為36.0%(1041/2889)、台南為24.1%(680/2821)、屏東為12.6%(269/2138)、嘉義為30.5%(649/2131)、雲林為 19.9%(316/1586)、高雄為30.6%(299/976)。再看2002至2004年這三年的上半年，一至六月的分娩頭數比例，每年的三月份是最多的，三月份分娩頭數比例已由2002年的20.9%及2003年的20.3% 增加為2004年的27.4%；每年的五月份泌乳牛的305-2X-ME乳量預估值平均分別有6903、7085和7107公斤。因此，乳牛在三月分娩可能有利於泌乳天數的縮短為305天及其胎距在365天左右，藉以達到乳牛一年一胎的繁殖方式。

關鍵語：乳牛、胎距、泌乳天數。

FREQUENCY OF ONE CALVING PER YEAR IN DAIRY COWS

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Lactation length of milking cows in the Dairy Herd Improvement Program from 1995 to 2004 were 346(n=9491 cows), 351(9991), 352(9435), 350(9962), 360(13709), 347(14891), 342(15301), 348(17493), 356(20051) and 352(12747) days, respectively. Mean age of drying for milking from 1995 to 2004 were 5.21, 5.29, 5.29, 5.33, 5.25, 5.22, 5.17, 5.09, 5.06 and 5.11 years old, respectively. Most of means on lactation length in years were more than 350 days; therefore, the possibility to having one calving per year would be less. However, the top first rank cow had 330 days of calving interval as compared from 3760 cows which giving birth during the period between November of 2003 and April of 2004 with

their pedigree data. The 100th cow of top listings had 337 days of calving interval, which that there were more than 2%(100/3760) of cows having the ability to having one calving per year as compared to the mean of 450 days on calving interval in the population. There were 22% of cows had four and more lactations in the top 100 cows with the shortest calving interval. Cow ID 10016147, daughter of 29H4397 bull, had a mean of 335 days on her 10 lactations. A total of 14,866 cow having three lactations within five year olds dated from 1997 to 2004 and mean of calving interval of each cow was calculated and ranked in ascending order. There were 27.4%(4074/14866) of cows with calving interval less than 365 days. In the greater six county region of cow herds, frequencies of one calving per year was 36.0%(1041/2889) in Chunghua, 24.1%(680/2821) in Tainan, 12.6%(269/2138) in Pingtung, 30.5%(649/2131) in Chiayi, 19.9%(316/1586) in Yulin, and 30.6%(299/976) in Kaohsiung. Month ratio for calving among January to June were calculated and it showed that March was the highest and was 20.9% in 2002, 20.3% in 2003 and 27.4% in 2004 with growth. Milk yield of 305-2X-ME were 6903, 7085 and 7107 kg, respectively, for milking cows in May of 2002 to 2004. Hence, cows gave birth in March not only to shorten lactation length to 305 days but also to maintain a 365-day of calving interval and such reproduction way would easily to have the status of one calving per year in Taiwan.

Key Words: Dairy cows, Calving interval, Lactation length.

**種豬選拔指數敏感度分析**

種豬選拔指數敏感度分析

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以日增重(kg/d)、飼料效率及背脂厚度(cm) 1.0: -1.0 : -0.5 及1996年美國豬種改進聯盟推薦的制式豬種改良程序遺傳參數資料為中心，進行敏感度模擬分析。結果發現，遺傳參數變動對指數的係數變動影響很大，相對的有限經濟加權值變動的影響則較可預測，如經濟加權值為 1.0 : -1.0: -0.5 改變至 1.0: -1.2 : -0.8 則指數 b值由 75.2、 -48.0、 -39.6，變化為 60.5 、 -42.2、 -43.7。若性狀間存在高度的表型相關，如日增重與飼料效率間存在高度的表型相關(≦ -0.6，如 －0.7、－0.8、-0.9)，會造成如同迴歸分析中多重共線的迴歸係數估計問題，影響指數的穩定性(指數係數正負號與經濟加權值正負號不一致)。池(1980)首次研訂台灣種豬選拔指數後，已使用於檢定站二十多年，由於豬種在進步，飼料、工資及醫療費用隨國際穀價、國民所得與時間而波動，二十年前首訂的台灣的種豬的選拔指數需要適時加以修訂。依敏感度分析結果，建議小幅度修正經濟加權值，並重新彙整國內外遺傳參數文獻，引用折衷之遺傳參數，作為重新制定中央檢定指數之依據。另一個替代方案則為以混合模式估計各性狀個體育種價，再直接以經濟加權值等比平移轉換( Ī = 100，σI = 25)計算種豬指數。

關鍵語：選拔指數、經濟加權值、遺傳參數。

SENSITITVE ANALYSIS OF SELECTION INDEX FOR PIGS

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Based on economic weights of ADG (kg/day), FE (Feed/Gain), and BF thickness (cm) with ratio of 1.0 : -1.0 : -0.5 and genetic parameters of Guidelines for Uniform Swine Improvement Programs (The National Swine Improvement Federation, NSIF, Cynthia and Todd, 1996), trails of sensitive analysis were simulated. Genetic parameters had considerable influence on estimated coefficients of selection indices. However, reasonable changes of economic weight will not sway of b vector of index to unpredictable range. For example, changes of the economic weights from 1.0 : -1.0: -0.5 to 1.0: -1.2 : -0.8 would change the b vector from 75.2, -48.0, -39.6 to 60.5, -42.2, -43.7 only. However, high phenotypic correlation(rp), such as rp of ADG and FE ≦ -0.6(-0.7, -0.8, or -0.9), may produce unstable estimates as multicollinearity problems in the regression analysis. Because, swine selection indices of Taiwan were first proposed by Chyr(1980) in 25 five years ago. Many improvements achieved in the pig industry, reevaluation of the swine selection index becomes crucial for further efficient breeding practice. For changes of the new index, suggestions includes, 1) re-ratio the economic weights by new market information 2) review new published genetic parameters of Taiwan and other countries. Suggestions 1) and 2) can be used to rebuild the selection index. But, alternative option is using the mixed model to estimate breeding value of each trait of individual first, and then weight traits by economic values directly, finally, transform the coefficients of index to achieve Ī = 100, σI = 25.

Key Words: Selection index, Economic weight, Genetic parameters.

**豬第八號染色體微衛星型遺傳標記與經產母豬產仔性能之相關性研究**

豬第八號染色體微衛星型遺傳標記與經產母豬產仔性能之相關性研究

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在豬隻第八號染色體上平均地選擇15個微衛星型遺傳標記，此15個標記在第八號染色體連鎖圖譜約佔130分摩根（cM），用以篩檢242頭種母豬DNA基因型。所分析之產仔性狀有三種，包括總產仔數、活仔數及仔豬存活率。基因型檢測結果顯示每個遺傳標記之交替基因分布，皆有品種間的差異。以一般線性模式和最小平方法分析母豬個別遺傳標記交替基因與其產仔性能之結果顯示：一些標記交替基因與四個品種母豬的產仔性能有極顯著相關並具正效應。例如KS188-B8對藍瑞斯母豬具有正效應，同時，KS141-B2與KS168-B3對約克夏母豬和KS148-B2，-B5，-B8、KS192-B5、KS141-B1、KS140-B3對杜洛克母豬及SW1843-B1，-B9、SW61-B15對盤克夏母豬具有正效應。同樣地，不同品種母豬具有某些交替

基因，其產仔性能則會比未具有該交替基因者差。

關鍵語：微衛星型標記、連鎖圖譜、產仔性能。

ASSOCIATION STUDY BETWEEN MICROSATELLITE MARKERS ON SWINE CHROMOSOME 8 AND THE LITTER PERFORMANCE OF PAROUS SOWS

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A total of fifteen microsatellite markers averagely spread on swine chromosome 8 (SSC8) were used to genotype 242 parous sows, including Landrace, Yorkshire, Duroc and Berkshire breeds. These markers spanned about 130 cM on the linkage map of SSC8. Three traits including litter size at birth and born alive as well as the corresponding survivability of piglets were considered in this study. The result indicated that there were significant breed effects existed in the distribution of allele frequency for all markers analyzed. The general linear model via least-squared method was further applied to study the relationship between litter performances described above and the presence of individual allele for parous sows in Landrace, Yorkshire and Duroc breeds. Both positive and negative effects of alleles on sows' performances were observed. For example, the marker-allele groups (KS188-B8), (KS141-B2 and KS168-B3), (KS148-B2, -B5, -B8, KS192-B5, KS141-B1, and KS140-B3), and (SW1843-B1, -B9, and SW61-B15) were beneficial for Landrace, Yorkshire, Duroc, and Berkshire sows, respectively. However, alleles with inferior effects on sows' litter performances were also found in this study.

Key Words: Microsatellite marker, Linkage map, Litter performance.

**以微衛星型遺傳標記分析蘭嶼豬與桃園豬之遺傳多樣性**

以微衛星型遺傳標記分析蘭嶼豬與桃園豬之遺傳多樣性

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遺傳多樣性係由生物為適應環境而演化所形成的，為目前國際研究的熱門重點之一。而以微衛星型遺傳標記評估動、植物之遺傳多樣性則為廣受研究人員所應用的技術。因此，本研究嘗試以九種豬微衛星型遺傳標記，篩檢78頭蘭嶼豬與60頭桃園豬基因組DNA，再將所得到的遺傳標記交替基因分布頻率以套裝軟體DISPAN分析，其結果為蘭嶼豬的平均異質性為0.49±0.08，桃園豬則為0.44±0.08，但由於九個遺傳標記的其中一個標記，其所篩檢樣品的分析結果，僅出現兩個交替基因，故導致整個族群平均異質性下降。因此，在以微衛星型遺傳標記估算生物基因多樣性時，應該慎選足夠數量並具有代表性的遺傳標記，如此分析出來的數值才比較客觀正確。

關鍵語：微衛星型標記、遺傳多樣性、平均異質性。

ANALYSIS OF GENETIC DIVERSITY OF LANYU AND TAOYUAN PIGS BY MICROSATELLITE MARKERS

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Genetic diversity is formed with biological evolution to make organisms accommodate the environmental changes and it is one of the hot studies in the world. Analyzing the genetic diversities of animals and plants with microsatellite markers is served as a tool in which is applied by many related researchers. Therefore, a total of nine porcine microsatellite markers averagely spread on seven chromosomes were used to genotype the genomic DNAs of 78 Lanyu and 60 Taoyuan pigs, respectively. Allele Frequencies of nine markers were used and then analyzed by the package software of DISPAN. The results showed that the average heterozygosities of Lanyu and Taoyuan pigs were 0.49±0.08 and 0.44 ±0.08, respectively. The average heterozygosity of a population is lower than the expected, for one of nine markers has only two alleles in the analysis. Hence, when using microsatellite markers to evaluate the biological genetic diversity, the adequate and representative markers should be considered carefully. And consequently, the calculated value of genetic diversity will be more objective and accurate.

Key Words: Microsatellite marker, Genetic diversity, Average heterozygosity.

**二細胞期與八細胞期高繁殖力豬胚外科採集時間之探討**

二細胞期與八細胞期高繁殖力豬胚外科採集時間之探討

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本試驗旨在探討獲得二細胞期與八細胞期豬胚之適當外科採集時間。應用七月齡以上之藍瑞斯女豬經律期媒（Regumate）連續餵飼 15 天後，隔天 2000 IU 孕馬血清激性腺素（Pregnant mare serum gonadotropin, PMSG）之肌肉注射，間隔 72 78 小時再注射1500 IU 人類絨毛膜激性腺素（Human chronic gonadotropin, HCG），所有誘發發情之女豬於 HCG 注射後 24 及 30 小時，以人工授精方法進行複次配種，分別在第一次配種後 48 50 小時、66 68 小時、78 80 小時、89 91 小時、95 97 小時進行外科手術取胚，以尋找獲得二細胞期與八細胞期豬胚之適當時間。結果所得之二細胞期與八細胞期豬胚比率分別在 48 50 小時者(n=12)為49.3及 0%、在66 68 小時者(n=3)為 10.4 及1.3%、在78 80 小時者(n=4)為1.4及14.8%、在89 91 小時者(n=3)為3.7及 9.3%、在95 97小時者(n=3)為0 及22.6%。此結果顯示二細胞期豬胚外科採集時間在第一次配種後 48 50 小時較佳，而八細胞期豬胚外科採集時間在第一次配種後 95 97小時較佳。

關鍵語：外科採集、二細胞期豬胚、八細胞期豬胚

STUDIES ON SURGICAL COLLECTION DURATION OF 2-CELL
AND 8-CELL STAGE OF PORCINE EMBRYOS

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The purposes of this study were to find suitable surgical collection times to flush more 2-cell and 8-cell stage of pig embryos. Gilts at seven months of age or older were synchronized by feeding with 20 mg of Regumate daily for fifteen days, then received 1500 IU PMSG and 1000 IU HCG on 24 hrs and 72 to 78 hrs after synchronized, and artificially inseminated at 24 h and 30 h after HCG was injected. Five different surgical times (48 to 50 h, 66 to 68 h, 78 to 80 h, 89 to 91 h and 95 to 97 h after the first artificially inseminated) were compared to find the optimum time for recovering more 2-cell or 8-cell stage embryos. The frequency of 2-cell and 8-cell stage of five different surgical times were 49.3 and 0% at 48 to 50 h (n=12), 10.4 and 1.3% at 66 to 68 h (n=3), 1.4 and 14.8% at 78 to 80 h (n=4), 3.7 and 9.3% at 89 to 91 h (n=3) and 0 and 22.6% at 95 to 97h (n=3), respectively. The results showed that 48 to 50 h after the first artificially inseminated for recovering more 2-cell stage embryos was better surgical time, and 95 to 97 h after the first artificially inseminated for more 8-cell stage embryos was the better surgical duration.

Key Words: Surgical collection, 2-cell stage of pig embryo, 8-cell stage embryo.

**豬粒線體DNA D-loop高變異序列定序分析**

豬粒線體DNA D-loop高變異序列定序分析

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為探討豬隻粒線體DNA D-loop區域的多態性，本試驗設計了一組引子可以藍瑞斯、約克夏、杜洛克、盤克夏豬、梅山豬及桃園豬種豬之基因組DNA為模板，增殖出包含豬粒線體DNA D-loop區域的DNA片段，然後應用設計好之兩組適當引子對進行定序反應，以獲得DNA序列。將試驗所得D-loop區域DNA之序列與GenBank 編號AF034253序列比對，結果發現 (1)72頭種豬之D-loop區域位置1-710之序列共有17個位置發生變異，其中有16個變異為同類置換，初步可分成7種類型。(2)在序列位置711後有5’-CGTGCGTACA 10 bp的重複序列16-27個。(3)在位置711-1175之間與比對序列有4處位置與7處位置變異兩類型。綜合以上結果顯示DNA序列分析可產生較多之多態性。

關鍵語：豬粒線體DNA、D-loop區域、定序分析。

SEQUENCE ANALYSIS OF MITOCHONDRIAL DNA D-LOOP
HYPERVARIABLE REGION IN SWINE

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Polymorphism of mitochondrial DNA (mtDNA) D-loop region in swine was studied, a pair of primers were designed to amplify the whole D-loop region of pig mtDNA from the genomic DNA of Landrace, Yorkshire, Duroc, Berkshire, Meishan and Taoyuan stock, then the PCR products were amplified by four suitable and designed primers. According to the reference sequence GenBank AF034253, there were 17 site substitutions in the sequence position 1 to 711 of D-loop region among 72 stock swine, sixteen nucleotide variations were transition. Seven type substitutions were distinguished. The number range of tandem repeat 5 ’-CGTGCGTACA after position 711 of D-loop region was 16 to 27. There were 4 site and 7 site substitutions in the sequence position 711 to 1175 of D-loop region. The results showed that DNA sequence analysis might distinguish more polymorphisms of swine.

Key Words: Swine mitochondrial DNA, D-loop region, Sequence analysis.

**應用粒線體DNA D-loop序列進行豬品種演化分析**

應用粒線體DNA D-loop序列進行豬品種演化分析

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本研究旨在探討台東蘭嶼豬與野豬之遺傳距離以及現今台灣豬種之間的親源關係。收集盤克夏、杜洛克、藍瑞斯、約克夏及梅山豬已發表之DNA D-loop序列與供試驗之本地豬種（畜試迷彩豬、蘭嶼豬、台灣山豬、畜試黑豬一號以及蘭嶼豬配上台灣山豬雜交種）的粒線體DNA D-loop雙向序列，以電腦進行資料比對。結果顯示畜試迷彩豬與蘭嶼豬及雜交種之基因同源性高；然蘭嶼豬與台灣山豬之基因同源性亦高，可能在圈養過程中，台灣山豬跳進畜舍或是其他原因，有待釐清。畜試黑豬一號為桃園豬與杜洛克育成豬種，卻與盤克夏豬基因相近，仍需進一步試驗結果以釐清。利用粒線體DNA研究豬母性遺傳進而追溯各不同豬品種間演化遺傳證據已然成為研究豬種核外遺傳之有效工具，盼能由試驗結果確認雜交豬種之親源關係並瞭解各豬種之演化過程。

關鍵語：粒線體DNA、D-loop序列、演化分析。

PHYLOGENETIC ANALYSIS OF PIG BREEDS DETERMINED USING MITOCHONDRIAL DNA D-LOOP SEQUENCE VARIATION

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The aim of this present study was to investigate representing ancient and current varieties of pig breeds in Taiwan. Phylogenetic relationships among pig breeds in Taiwan were assessed using mitochondrial DNA (mtDNA) D-loop sequences. A phylogram tree was constructed from pairwise distances using sequences determined for published sequences of European pigs (including Berkshire, Duroc, Landrace and Yorkshire) and Meishan; local (LRI Mitsai pig, Lanyu, Formosan mountain Boar, TLRI Black No.1 and Lanyu × Formosan mountain Boar hybrids) breeds. The result showed LRI Mitsai pig clustered together with Lanyu and Lanyu × Formosan mountain Boar hybrids, respectively. Lanyu was likely to the Formosan mountain Boar, indicating that Formosan mountain Boar may run into corrals and break the hereditary. Though TLRI Black No.1 was the Taoyuan and Duroc hybrids, Berkshire was also similar to TLRI Black No.1. The inferred reasons have to further analyze and compare the pedigree. Using mtDNA to research porcine maternal inheritance and then to trace back the evolution of various breeds can be effective for researches of extranuclear genetics in pigs. Results found mtDNA can be used to recognize maternal origin for hybrid pigs and to comprehend the evolution in various pig breeds.

Key Words：Mitochondrial DNA, D-loop sequence, Phylogenetic analysis.

**桃園豬皺紋觀察**

桃園豬皺紋觀察

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桃園種豬在台灣養豬事業中曾佔有重要地位，過去傳統上常以餿水、蕃薯藤、剩飯菜餵飼豬隻，因此飼養時間長且背脂厚，致民間日益棄養而有絕種之虞。92年桃園豬保種計畫開始進行皺紋觀察，桃園豬出生一日、一週與一月齡仔豬身體皮膚光滑，臉部眼框周圍已有明顯且固定的放射狀皺紋，與一日齡杜洛克及藍瑞斯仔豬臉部平滑比較有明顯差異。二月齡桃園豬額頭皺紋由放射狀直條型改為漩渦狀塊狀型皺紋，且隨日齡增加皺紋逐漸加深加大，呈老態狀。出生一日齡桃園仔豬尾部開始出現圈狀皺摺，直到二月齡尾部圈狀皺摺開始增多且紋路明顯。一月齡桃園豬腹部下垂呈圓球狀，二月齡腹部下垂明顯，至三月齡開始部分桃園豬腹部有幾近垂地情況，且背凹出現，四月齡體型加長但體高較洋種豬短，且背凹明顯。

關鍵詞：桃園豬、皺紋觀察

WRINKLE OBSERVATION OF TAOYUAN BREED OF PIGS

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Taoyuan pig had ever played an important role in Taiwan's swine production. Traditionally the pig was raised by kitchen waste, potato, and vine sweet and due to a longer raise period, pigs had a thicker back fat. Therefore the pig was eliminated gradually and faces a risk of extinct. In the Taoyuan pig conserve project of 2003, the formation of wrinkle has been observed and showed that the forehead of Taoyuan piglet at birth already had significant wrinkles compared with Duroc and Landrace of the same age, and the wrinkle type was observed from radiant straight to zigzag curve by growth. The tail of Taoyuan piglet at birth showed circular wrinkle, besides the number and depth were gradually increased from the 2nd month. Taoyuan piglet on the 1st month already had a fallen abdomen, and the transformation of fallen belly became more obvious by raising. While Taoyuan pig was three months old, the sunken back was generated and the belly was nearly touched to the ground.

Key Words: Taoyuan pig, Wrinkle observation.

**桃園豬體型與皺紋條帶數量測**

桃園豬體型與皺紋條帶數量測

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生物多樣性公約的三大目標：保育生物多樣性；永續利用其組成；公平合理的分享由生物多樣性遺傳資源所產生的利益。桃園豬為畜產種原保種動物，對瀕臨絕種且具本土特色之桃園豬進行各項研究，有助於增加台灣本地畜產物種之多樣性。本試驗收集90－92年桃園豬28胎體型性狀與93年分娩9胎皺紋資料，桃園豬24週齡體型性狀分別為：體高43.41 ± 6.36 cm、十字部高48.37 ± 6.65 cm、體長80.71 ± 10.77 cm、胸圍76.24 ± 10.32 cm、管圍13.88 ± 1.89 cm、尾徑9.98 ± 1.57 cm、後幅22.68 ± 3.34 cm、胸幅20.93 ± 3.18 cm、前幅22.40 ± 3.40 cm、胸深25.44 ± 3.53 cm、量測三點背脂厚度平均1.95 ± 0.55 cm。出生一日齡、一周與一、二、三、四等月齡桃園豬右額頭皺紋條帶數分別為3.00 ± 0.71條、2.45 ± 0.89條、2.22 ± 1.29條、2.33 ± 0.86條、3.48 ± 1.36條、2.06 ± 0.43條；左額頭皺紋條帶數2.88 ± 0.68條、2.29 ± 0.90條、2.34 ± 1.47條、2.33 ± 0.86條、3.43 ± 1.21條、2.12 ± 0.60條；尾部環狀圈數3.20 ± 1.01、3.65 ± 1.05、4.34 ± 2.50、7.67 ± 4.08、9.43 ± 3.44、14.12 ± 3.59。

關鍵詞：桃園豬、體型、皺紋。

MEASUREMENT ON BODY CONFORMATION AND WRINKLE TRAITS OF TAOYUAN BREED OF PIGS

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The targets of convention on biological diversity are constant conservation and utilization of biodiversity, and reasonable sharing the benefit from genetic resource. The study was to recognize the biodiversity of Taoyuan pig, a kind of Taiwan native breed, which is faced with the extinct risk. The data of body type at 24th week of Taoyuan pig showed that body height, cross height, body length, breast circle, foot circle, tail circle, back width, breast width, front width, breast depth and average back fat thickness were 43.41 ± 6.36, 48.37 ± 6.65, 80.71 ± 1.77, 76.24 ± 10.32, 13.88 ± 1.89, 9.98 ± 1.57, 22.68 ± 3.34, 20.93 ± 3.18, 22.40 ± 3.40, 25.44 ± 3.53 and 1.95 ± 0.55 cm, respectively. The numbers of wrinkle on right and left forehead (Right / Left ) at birth, 1st week, 1st, 2nd, 3rd, 4th month were 3.00 ± 0.71 / 2.88 ± 0.68, 2.45 ± 0.89 / 2.29 ± 0.90, 2.22 ± 1.29 / 2.34 ± 1.47, 2.33 ± 0.86 / 2.33 ± 0.86, 3.48 ± 1.36 / 3.43 ± 1.21 and 2.06 ± 0.43 / 2.12 ± 0.60, respectively. The simultaneous investigations of tail ' s wrinkle were 3.20 ± 1.01, 3.65 ± 1.05, 4.34 ± 2.50, 7.67 ± 4.08, 9.43 ± 3.44 and 14.12 ± 3.59 circles, respectively.

Key Words: Taoyuan pig, Body conformation, Wrinkle.

**登錄母豬的每胎出生活仔數**

登錄母豬的每胎出生活仔數

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種母豬群年繁殖效率之高低主要決定於出生時活仔數與胎距長短。登錄母豬於1992至2003年間的分娩資料，杜洛克有51,184胎，平均每胎出生活仔數為8.63 頭；藍瑞斯有83,932胎，平均每胎出生活仔數為9.45頭；約克夏27,636胎，平均每胎出生活仔數為8.92 頭。近12 年來，杜洛克由8.18+2.65頭(平均+標準偏差)增為9.32+2.42頭；藍瑞斯由8.91+2.76頭增為10.20+2.50頭；約克夏由8.77+2.85頭增為8.99+2.59頭。分娩胎數在1997年因口蹄疫事件而減少20~30%，但平均每胎出生活仔數卻增加，此乃

因種豬場藉機進行精實方案，保留多產母豬。每年每品種的出生活仔數最大值界於15~22頭，杜洛克生最多的一胎是21頭活仔豬(2001年)，藍瑞斯生最多的一胎是21頭活仔豬(1994年)，約克夏生最多的一胎是22頭活仔豬(1997年)。登錄母豬的每胎出生活仔數資料是種豬場的經營管理系統中，可供評估該場豬群年繁殖效率用。台灣地處亞熱帶，月平均濕度的範圍在79.2%到85.2%，年平均濕度為82.7%，故全年均處於潮濕狀況，平均每日最低溫高於年平均溫度(23.2°C)的六、七、八月份為高溫多濕的季節。每年四月份至十一月份間，南部地區每日最高溫常在29°C以上，母豬群長期處於此環境下，其胚胎存活率、分娩率、出生時活仔數亦受到配種月份及配種後環境溫差的影響。

關鍵語：出生活仔數、登錄、種豬。

LITTER SIZE BORN ALIVE IN PEDIGREE REGISTERED SOWS

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Sow productivity depends on litter size born alive and gestation interval. Sows with pedigree registered were recorded for their birth data from 1992 to 2003. A total of 51,184 litters was used from Duroc sows and the average of litter size born alive was 8.63 head. There was 9.45 head of litter size born alive from Landrace sows of 83,932 litters. Yorkshire sows had 8.92 head born alive per litter from 27,636 litters in average. For the past 12 years, Duroc had 8.18+2.65 (Mean+SD) head born alive per litter and increased to 9.32+2.42 head; from 8.91+2.76 head up to 10.20+2.50 head in Landrace sows; from 8.77+2.85 head to 8.99+2.59 head in Yorkshire sows, respectively. Due to FMD outbreak in 1997, there was a decrease of 20~30% on number of litters registered resulting from sow culling. However, the average litter size born alive increased after keeping most of prolific sows in a nuclear herd. The largest number in a litter ranged from 15 to 22 of alive piglets in recording data. The largest one was 21 alive piglets in Duroc dated on 2001; 21 in Landrace dated on 1994 and 22 piglets in Yorkshire dated on 1997. Data of litter performance in a breeding herd is able to evaluate reproductive efficiency of a sow herd. Housing environment for sows in relation to temperature and relative humidity, like 79.2~85.2% of RH varied in month with a mean of 82.7% and along with hot weather during June to August above the 23.2°C of annual mean temperature in Taiwan. Therefore, sows raised in the southern region of Taiwan during the period of April to November would cause fetal loss, low farrowing rate and small litter size born alive which associated with her mating month and pregnant months.

Key Words: Litter size born alive, Pedigree registered, Breeding pigs.

**種豬中央檢定與外貌体型評鑑相關性探討**

# 種豬中央檢定與外貌体型評鑑相關性探討

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本研究乃針對中央檢定站檢定合格種豬進行外貌体型評鑑，以了解中央檢定對種豬外貌体型改良之影響。研究自2002年1月至2004年3月期間，在中央檢定站於各期完檢後之合格種豬共計1602頭（公豬：1438頭；女豬：164頭）進行外貌体型評鑑，並自各品種檢定合格頭數中選取其1/2至1/3頭數排名評等。另將外貌体型評鑑之評等排名與其檢定指數100以上之順位序列，進行史畢滿順位相關係數（Spearman's Rank Correlation Coefficient）分析。由數據顯示，各期送檢種豬頭數中以杜洛克公豬最多（50%以上），次為藍瑞斯公豬。經檢定合格且外貌体型評鑑錄取率約20%，計308頭（公豬：250頭；女豬：58頭）。由杜洛克種公豬之史畢滿順位相關顯示，檢定指數與外貌体型評鑑之相關性至高（r=0.73），顯示其經濟生長性與優異外貌体型之遺傳有頗高之穩定性；另綜觀藍瑞斯公豬之史畢滿順位相關係數偏大，其原因可能為公系用種公豬與母系用種公豬之体型有所區隔之故；由杜洛克及藍瑞斯母豬史畢滿順位相關，發現做為公系用品種之杜洛克母豬之順位相關r=0.5，而母系用品種藍瑞斯母豬之r=1.0，顯示杜洛克母豬受杜洛克公豬之傾向筋肉之肉豬型体型之影響較深，使外貌体型評等與檢定成績之順位相關不如藍瑞斯之一致。

關鍵語：體型、中央檢定、史畢滿順位相關係數。

# ASSOCIATION BETWEEN PERFORMANCE OF CENTRAL TEST STATION AND CONFORMATION JUDGING OF PIGS

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The purpose of this study was to explore the reason of using performance data in pig conformation judging and to understand the influence of performance on conformation judging. Data of pig conformation judging was collected from Jan. 2002 to Mar. 2004. There were 1602 pigs performance tested totally, in which 1438 was young boars and 164 was gilts. Judging practiced only on top 30% to top 50% animals based on test performance. Re-edited data set kept animals' with index equal or above 100 only. Spearman's Rank Correlation Coefficient (rs) was the main statistic for the associations. In the data set, Duroc boar had highest frequency( > 50%) completed the performance test and frequency of Landrace boar was next to Duroc boars. The certified pigs was around 20%, 308 pigs, 250 boars and 58 gilts, in total. The Spearman's Rank Correlation Coefficient of Duroc boars was 0.73 which indicated high association between performance and conformation judging's. But, the high coefficient of the Landrace boars might related to the difference of the selection goals between sire line and dam line. The rs s of Duroc and Landrace gilts were 0.5 and 1.0 respectively which implied gilts of Duroc might too emphasized on muscularity and turned to less consistent than Landrace gilts'.

Key Words: Body conformation, Central test station, Spearman's Rank Correlation

Coefficient.

**台灣荷蘭牛雙胎率與freemartin DNA檢測**

台灣荷蘭牛雙胎率與freemartin DNA檢測

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為探討台灣乳牛的雙胞胎率及驗證雄相雌性體 (freemartin) DNA 檢測法，分析行政院農業委員會畜產試驗所自1987年至2003年乳牛分娩記錄，共計1284胎。其中雙胞胎率為2.9% (37/1284)，異性雙胞胎率為1.3% (17/1284)。異性雙胞胎的女牛於1 歲齡左右以直腸觸診其生殖器官是否正常，在17頭異性雙胞胎的女牛有1 頭為正常個體 (5.9%)，該女牛經配種後，並順利產下正常仔牛。以牛性別標記AMX/Y檢測該牛隻，結果證實該已產仔之雙胞胎母牛為雌性基因型。進一步，應用南部一家種牛場3胎異性雙胞胎仔牛血樣DNA，仔女牛則皆帶有雄性基因型，這些仔女牛判定為雄相雌性體。本試驗證明荷蘭乳牛雙胎率達 2.5%以上。以牛性別標記AMX/Y鑑別女牛是否為雄相雌性體，為一簡易可靠的DNA分生檢測方法，檢測結果可提供酪農作為選留異性雙胞胎仔女牛依據。

關鍵語：牛、雄相雌性體、遺傳標記。

TWINING RATE OF TAIWAN HOLSTEINS AND DNA
FREEMARTIN DIAGNOSIS

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The objective of this study was to investigate the frequency of twinning rate of Taiwan Holsteins and to test the reliability of DNA freemartin diagnosis. A total of 1284 reproductive records of cows at Livestock Research Institute, Council of Agriculture from 1987 to 2003 were analyzed. The twinning rate were 2.9% (37/1284) and heterozygous twinning rate was 1.3% (17/1284). Rectal palpation diagnosed freemartins held around one year old for the heterozygous twins. Only one heifer was normal in these 17 heterozygous twins. Tracing breeding records, the “normal heifer” grew up as a normal cow and gave a calf at last. There were four set blood samples applied for the reliability of DNA test, including the “normal heifers’ samples” and three other heterozygous twins from a southern dairy farm of Taiwan. AMX/Y was the selected as sexing genetic marker to identify genotypes of these animals. Test Results proved that the genotype of the “normal heifer” was a normal female, but other three heterozygous twins all had male genotypes. Results from this study indicated twining rate of Taiwan Holsteins was higher than 2.5% and DNA trials supported AMX/Y genetic marker was a simple and easy technique for diagnosis of freemartin in dairy cattle.

Key Words: Cattle, Freemartin, Genetic marker.

**山羊黏多醣症遺傳缺陷之SSCP 基因型檢測**

山羊黏多醣症遺傳缺陷之SSCP 基因型檢測

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本研究建立山羊黏多醣症遺傳缺陷之單股構型多態性 (SSCP) 基因型檢測方法, 應用此方法來檢測乙醯醣胺氨基硫酸酶 (N-acetylglucosamine 6-sulfatase, G6S)基因型不再需要使用限制酶, 可節省檢測時間、成本與人力。G6S基因的遺傳變異在山羊黏多醣症第三型(Mucopolysaccharidosis IIID)扮演重要的角色。以限制酶分析該基因所增幅出的聚合酶連鎖反應的產物已被應用於該遺傳疾病的檢測, 其突變點的位置在G6S cDNA 第322個核苷酸上 (C→T)。聚合酶連鎖反應結合單股構型多態性分析 (PCR-SSCP) 是一種應用於鑑別基因 DNA 序列上的突變或多態性的技術, 在針對 DNA 序列的點突變與多態性的分析上較聚合酶連鎖反應結合限制酶切割片段長度多型性分析(PCR-RFLP) 更有利。發展出來的山羊黏多醣症遺傳缺陷之 SSCP 基因型檢測方法, 可以快速有效率的檢測 G6S 基因型, 以此法檢測 49 頭努比亞山羊, 結果與 PCR-RFLP 的檢測結果一致 (四頭雜合型與45頭正常型), 可以準確地檢測出山羊黏多醣症。

關鍵語：山羊、單股構型多態性、黏多醣症。

SSCP GENOTYPING FOR INHERITED DEFICIENCY OF
CAPRINE MUCOPOLYSACCHARIDOSIS IIID

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Genetic variation in the N-acetylglucosamine 6-sulfatase (G6S) gene is the key role in caprine Mucopolysaccharidosis IIID. A more efficient SSCP (single-strand conformation polymorphism) method is experimented to identify goat G6S genotypes, allowing the detection of the sequence variation without using endonuclease. Comparing the reported G6S PCR-RFLP method, which applied the restriction site around the 322 mutation position (C→T) of N-acetylglucosamine 6-sulfatase cDNA. Instead, with new designed primers, the updating PCR-SSCP was one of the efficient alternatives for identifying G6S mutant genotypes. From the PCR-SSCP tested results of 49 blood samples of Nubian goats, there were four carrier and 45 normal, which was consisted with PCR-RFLP's. The advantage of the improved goat G6S SSCP over RFLP analysis was having minimal number of steps, which can save time and total cost with acceptable accuracy.

Key Words: Goat, Single-strand conformation polymorphism(SSCP), Mucopolysaccharidosis.

**畜試土雞雜交後裔之屠體及肉質性能評估**

畜試土雞雜交後裔之屠體及肉質性能評估

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利用畜試土雞近親品系L7、L9、L11和L12雜交而成的二元雜交畜試公系(L12♂×L9♀)與二元雜交畜試母系A(L7♂×L9♀)及畜試母系B(L7♂×L11♀) 之四元雜交後裔，分別為商用土雞F系與G系，飼養至12、14及16週齡，進行屠體測定及肉質分析，並購買市售白色肉雞，供為肉質分析之對照組。官能品評部份除畜試所之雜交土雞外，並選購仿土雞及白肉雞等供品嚐比較。屠體性狀包括活體重，屠體重及各分切部位重、內臟等，並分別稱重。胸肉及腿之肉質分析項目包括游離水、PH值、剪力值、乳化力、水份、脂肪、蛋白質、及灰分等項目。屠體測定結果：F系與G系於14週齡時則頭頸、腿及心等部位，在品系間具顯著差異(P
關鍵語：土雞、雜交、肉質。

CARCASS COMPOSITION AND MEAT QUALITY OF HYBRID
OFFSPRINGS FROM TLRI NATIVE CHICKEN LINES

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The four way hybrids, hybrid F, was offspring of sire line (L12 ♂×L9♀) × Dam line A (L7♂×L9♀) and, hybrid G, was offspring of sire line (L12 ♂×L9♀) × Dam line B(L7♂×L11♀) of TLRI native chicken. Carcass composition and meat quality were evaluated at of 12, 14 and 14 weeks old. Broiler and simulated native chicken were the control groups for sensory evaluation. Carcass compositions include live weight, carcass weight, retail poultry cuts and internal organ weight, and meat quality include free water, pH value, shear value, emulsifying capacity and percentages of water, fat, protein and ash. The results showed that the weight of head and neck, leg, and heart of the carcass differ significantly between hybrid F and hybrid G at 14 weeks. But, backs, legs and ovaries of carcass of hybrids and F and G only differ significantly at 16 weeks. Shear values of hybrids F and G were 2.8%, 3.0% higher than 1.4% of broiler's, but fat percentages of hybrids were lower than broiler which were 1.9%(F), 1.7%(G), and 3.2%(broiler). According to the sensory evaluation, hybrid F and G of TLRI native chicken had high satisfactoriness and got 65% panelists ranked as number 1 or number 2.

Key Words: Native chicken, Hybrid, Meat quality.