

106 年獎助酪農參與乳牛基因體檢測計畫

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乳牛基因體選拔技術是全球乳業育種技術趨勢之一。這種利用單核苷酸多態性 (SNPs) 是一種強大的基因體選拔工具，是新一代分子標記選拔。本計畫執行目的是利用基因體評估系統分析台灣乳牛基因組成。使用 GeneSeek Prime 50K SNP 晶片進行母牛、母牛基因體檢驗。使用 GeneSeek Elite 150K SNP 晶片進行種用小公牛基因體檢驗。106 年度總計檢測 507 頭荷蘭乳牛 (其中 7 頭因品種不純及 DNA 檢驗訊息過弱，致無檢驗分析報告)、3 頭娟珊牛及 3 頭種用小公牛。遺傳評估主要包括 (1) 健康產量繁殖性狀、(2) 體型性狀、(3) 遺傳狀態和 (4) 親本鑑定。此次分析動物的基因體可信度介於 68-74% 之間。用以估算動物終生收益程度的淨值，其平均值為 60.55，排名前 10 大乳牛之終身淨值為 348 至 432，而排名最底 10 個之終身淨值是 -269 至 -402。平均產乳量 TPAM 為 12.18，前 10 乳產量數值為 1149 至 1597，後 10 隻介於 -1185 至 -1660。以體型組成及結構為主的綜合指數之體型指數 TPA type 部分，其平均值為 -0.13，前 10 體型指數為 1.31 至 1.83，而後 10 隻是 -1.68 至 -2.97。結果顯示本牛群個體遺傳潛力差異大。為了改善族群平均基因體結構及增進遺傳改進速率，可以加以淘汰最差者，並且增加菁英牛隻後代數量。

關鍵語：乳牛、基因體選拔、單核苷多態性

Implementing dairy cattle genomic testing in Taiwan

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Dairy cattle genetic evaluation technology, the use of genome information, is one of the global trends of dairy breeding technology. Such using of single nucleotide polymorphism detection (SNPs) is a powerful genomic selection tool and is a new generation technology of molecular marker selection. The aim of this study was to implementing genomic test system of Taiwan's dairy cattle for retaining of "good loci" in dairy herd. The study conducted genomic test on 507 B&W Holstein cattle by using GeneSeek Prime 50K SNP chip and on 3 young B&W Holstein bulls by using GeneSeek Elite 150K SNP chip. The genetic evaluation included (1) health-yield-fertility traits, (2) type traits, (3) genetic conditions, and (4) parentage validation. Genomics reliability of animals were between 68-74%. When looked at net merit of animal, a composite trait to provide an estimate of the lifetime profit of the animal. The average net merit was 60.55. Top 10 net merits were from 348 to 432. The worst 10 net merits were from -269 to -402. The average milk yield was 12.18. Top 10 milk yield were from 1149 to 1597. The worst 10 milk yields were from -1185 to -1660. The average type value was -0.13. Top 10 type values were from 1.31 to 1.83. The worst 10 type values were from -1.68 to -2.97. The results shown the individuals varied widely. For raising the herd's average genomic profile, it could cull the worst of the herd and increase the offspring number of the top animal of the herd.

Key Words: Dairy cattle, Genomic selection, SNP