出國報告

出國類別：開會(出席會員國會議)

出席國際畜政聯盟(ICAR)之會員國大會暨遺傳學應用於畜牧生產國際論壇(WCGALP)

服務機關：行政院農業委員會畜產試驗所

姓名職稱：黃振芳所長

吳明哲研究員兼遺傳育種組組長

派赴國家：紐西蘭

出國期間：民國107年2月5日至16日

報告日期：民國107年5月14日

摘要

畜產試驗所黃振芳所長為我國代表，於本(107)年 2 月 5 日至 12 日前往紐西蘭奧克蘭市出席「國際畜政聯盟(ICAR)之會員國大會(2 月 7 日至 11 日)」；另遺傳育種組吳明哲組長亦隨同於 2 月 5 日前往，代表我國參與國際畜政聯盟之 Global Reach(全球運籌組)之會議，以東亞洲會員國身分持續協助推動東南亞國家也能加入 ICAR，有助於促成我國熱帶乳牛產業與肉蛋生產畜牧業，能因採用 ICAR 國際規範而有機會發展至東南亞。吳明哲組長接續出席於 2 月 11 日至 16 日舉辦之「第 11 屆遺傳學應用於畜牧生產國際論壇 WCGALP」(每四年舉辦一次)，參與研商國際間家畜禽性能檢測、血統登錄及經濟性狀遺傳育種等科技應用工作。國際畜政聯盟會員國大會(59 國，87 個正式會員與 30 個贊助會員)於 2 月 10 日通過有關理事任期條文(第 11.1 條)「理事於一任四年及再一任四年的八年任滿後，得再被選任一次並最多延任兩年。」，藉此強化 ICAR 理事會運作組織架構之創造合作(Creating synergy)、持續改良(Improving continuously)、積極負責(Acting responsibly)三要素，提供全球畜產經營的新科技觀念，促使最先進科技可廣泛地被各國畜牧產業加以應用的科技普及化。ICAR 轄下有 4 個執行工作委員會(SC)：Recording Devices(記錄儀器委員會)、Animal Identification(動物標識委員會)、Milk Analysis(乳質分析委員會)及 Interbull(國際種公牛協會)，以及因需求而設置工作推動小組(WG)與專項運作小組(TF)等。這次會議也修正國際畜政聯盟轄下 4 個執行工作委員會(SC)及重組的 10 個工作推動小組(WG)成員，總計有 160 位國際專家為委員或組員，以及分別條列出 SC 及 WG 的近一年優先項目 66 個及下年度主要議題 65 個，要發揮 ICAR 的國際多功能服務。根據準則和服務規範，發給適用 ICAR 指引的 560 種動物檢測器具、58 個乳量計檢核實驗室、45 個基因及乳質分析實驗室。本次會議有物種應用、養殖學、遺傳改良目標、改良方法與工具、分子遺傳應用、理論產業化過程、新穎科技、產業問題解決、知識庫應用、及前瞻性議題等 10 個主題 873 篇研究報告，之中有 38 篇為前瞻性議題。主辦單位主席 Hugh Blair 教授宣布出席人數總計有 1,423 人，來自 70 個國家，台灣有 5 位(畜試所 2、屏科大 2 及中興大學 1)參加。日本、韓國、中國、菲律賓、泰國、印尼及印度分別有 25、16、16、5、4、1 及 7 人參加。美國 188 人、紐西蘭 160 人、澳大利亞 149 人、荷蘭 80 人及法國 73 人為最大團的前五國。大會於 2 月 14 日安排 10 個畜牧產業發展參訪團行程，總計有 696 人參加，台灣成員各有兩位參加種乳牛場發展團與養鹿產業團。ICAR 大會宣佈於 2019 年 6 月 17 至 21 日由捷克主辦 ICAR 會員國科技會議，荷蘭主辦 2020 年會員國大會暨執行委員工作會議。WCGALP 理事長 Hermann Swalve 教授(德國)於閉幕典禮宣佈第 12 屆 WCGALP 於 2022 年 7 月 3 至 8 日在荷蘭鹿特丹市舉辦。

目次

壹、目的

國際畜政聯盟(International Committee for Animal Recording,簡稱ICAR)成立的宗旨是建立全球標準化的畜產資訊，亞洲地區會員國(加入順序)僅有以色列、土耳其、印度、日本、韓國、台灣、俄羅斯、中國、烏克蘭等9個國家。國際畜政聯盟理事會新任理事會主席(2017年起)是美國代表Jay Mattison博士，他是2010年底引導我國用Taiwan名稱申請加入國際畜政聯盟為第51個會員國。畜產試驗所黃振芳所長為我國代表，於本(107)年2月5日至12日前往紐西蘭奧克蘭市出席「國際畜政聯盟(ICAR)之會員國大會(2月7日至11日)」；另遺傳育種組吳明哲組長亦隨同於2月5日前往，代表我國參與國際畜政聯盟之Global Reach(全球運籌組)之會議，以東亞洲會員國身分持續協助推動東南亞國家也能加入ICAR，有助於促成我國熱帶乳牛產業與肉蛋生產畜牧業，能因採用ICAR國際規範而有機會發展至東南亞。吳明哲組長接續出席於2月11日至16日舉辦之「第11屆遺傳學應用於畜牧生產國際論壇WCGALP」(每四年舉辦一次)，參與研商國際間家畜禽性能檢測、血統登錄及經濟性狀遺傳育種等科技應用工作。

貳、過程

日期	起迄地點	活動記要
2月5日	桃園機場-紐西蘭奧克蘭機場-奧克蘭市	啟程：晚間自台灣桃園機場
2月6日至10日	奧克蘭市	參加國際畜政聯盟(ICAR)會員國大會
2月11日	奧克蘭市	上午參加國際畜政聯盟(ICAR)會員國大會 下午參加遺傳學應用於畜牧生產國際論壇(WCGALP)
2月12日至15日	奧克蘭市	參加遺傳學應用於畜牧生產國際論壇(WCGALP)
2月16日	奧克蘭市機場-	上午參加遺傳學應用於畜牧生產國際論壇(WCGALP) 下午回程：自奧克蘭機場起飛回臺灣

參、心得

一、國際畜政聯盟組織架構及服務功能

國際畜政聯盟(ICAR)1951 年 3 月 9 日在羅馬成立的國際非政府組織(INGO)，致力成為動物鑑定、動物記錄和動物評估指南、標準和認證的全球領先標準。ICAR 作為註冊非營利性 INGO 的現有結構規定，其成員可充分參與其中的開發工作。目標是為確保會員國之間具一致性、最低性及最大的靈活的資料記錄。

ICAR 希望通過以下方式提高農業生產的營利能力和持續性：

(一)建立和維護動物識別和記錄方面的最佳實踐方針和標準。

(二)認證設備和動物鑑定、記錄和遺傳評估的過程。

(三)刺激及領導、持續改進、技術創新、研究知識發展和知識交流。

(四)提供動物記錄和動物育種方面技能與知識分享等國際合作服務。

ICAR 是動物記錄和生產力評估標準化的全球性組織。其成立之目的是通過制定經濟重要性狀測定的定義和標準，促進農場動物記錄和評估的改進。ICAR 的使命是通過行動為其成員組織提供福利：

(一)提供幫助成員組織開發，運營和管理業務的信息和服務。

(二)提供信息和服務，促進記錄和評估的好處，從而增加對 ICAR 成員組織提供的服務的需求。

(三)提供和標準，促進國家和國際成員組織提供服務和交流信息。

(四)提供一個機構，讓成員組織藉這個機構共同努力實現共同目標。

國際畜政聯盟組織架構精神蘊含創造合作(Creating synergy)、持續改良(Improving continuously)、積極負責(Acting responsibly)三要素(圖 1)。因此，其提供之畜產經營的技術總是最先進且可廣泛地被各國畜牧產業所接受及應用，該聯盟有關畜牧產業的指導方針和資訊即技術標準且也需適用世界各會員國使用，其沒有强求各國使用某一種特定紀錄的方法，但提供了最低需求，以保證紀錄之一致性。各國性能紀錄的機構可自由取決各國當地狀況，以決定其特別的性能紀錄之方法。

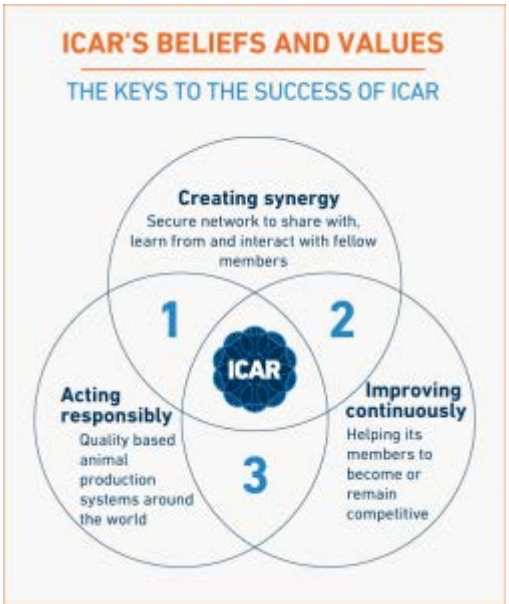


圖 1. ICAR 組織架構精神蘊含創造合作(Creating synergy)、持續改良(Improving continuously)、積極負責(Acting responsibly)三要素。

國際畜政聯盟會員國大會(59 國，87 個正式會員與 30 個贊助會員)於 2 月 10 日通過有關理事任期條文(第 11.1 條)「理事於一

任四年及再一任四年的八年任滿後，得再被選任一次並最多延任兩年。」，藉此強化 ICAR 理事會運作組織架構之創造合作(Creating synergy)、持續改良(Improving continuously)、積極負責(Acting responsibly)三要素，提供全球畜產經營的新科技觀念，促使最先進科技可廣泛地被各國畜牧產業加以應用的科技普及化。ICAR 轄下有 4 個執行工作委員會(SC)：Recording Devices(記錄儀器委員會)、Animal Identification(動物標識委員會)、Milk Analysis(乳質分析委員會)及 Interbull(國際種公牛協會)，以及因需求而設置工作推動小組(WG)與專項運作小組(TF)等。這次會議也修正國際畜政聯盟轄下 4 個執行工作委員會(SC)及重組的 10 個工作推動小組(WG)成員，總計有 160 位國際專家為委員或組員，以及分別條列出 SC 及 WG 的近一年優先項目 66 個及下年度主要議題 65 個，要發揮 ICAR 的國際多功能服務。根據準則和服務規範，發給適用 ICAR 指引的 560 種動物檢測器具、58 個乳量計檢核實驗室、45 個基因及乳質分析實驗室。

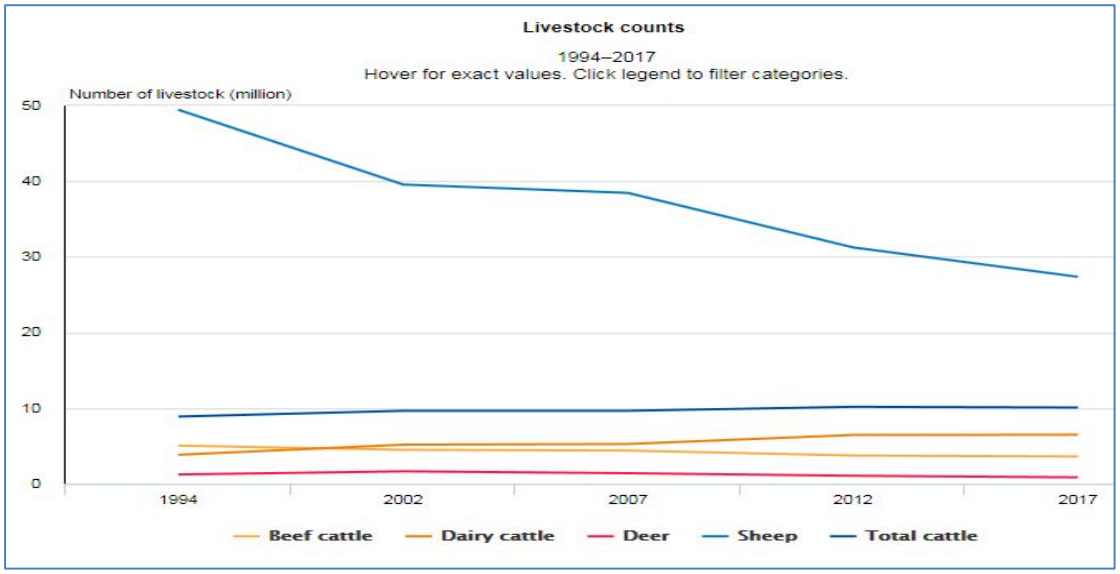
國際畜政聯盟(ICAR)以提升全球乳肉畜產品供應量及其品質，進行經濟動物的性能紀錄及其品質精準國際化為目標。並逐年修訂畜牧業資訊建置的指導方針和畜牧經營相關技術標準，適用於各會員國。各國檢測經濟動物性能的機構可自由地依據當地狀況，決定其所屬的性能紀錄之方法。此次會員國年會正式啟用新會徽，會徽由 10 個圓形代表質量，交疊後有如細胞聚落般的胚，因遺傳 DNA 種別而表現出可檢測性狀，集眾成大數據的國際物流畜產業圖騰。

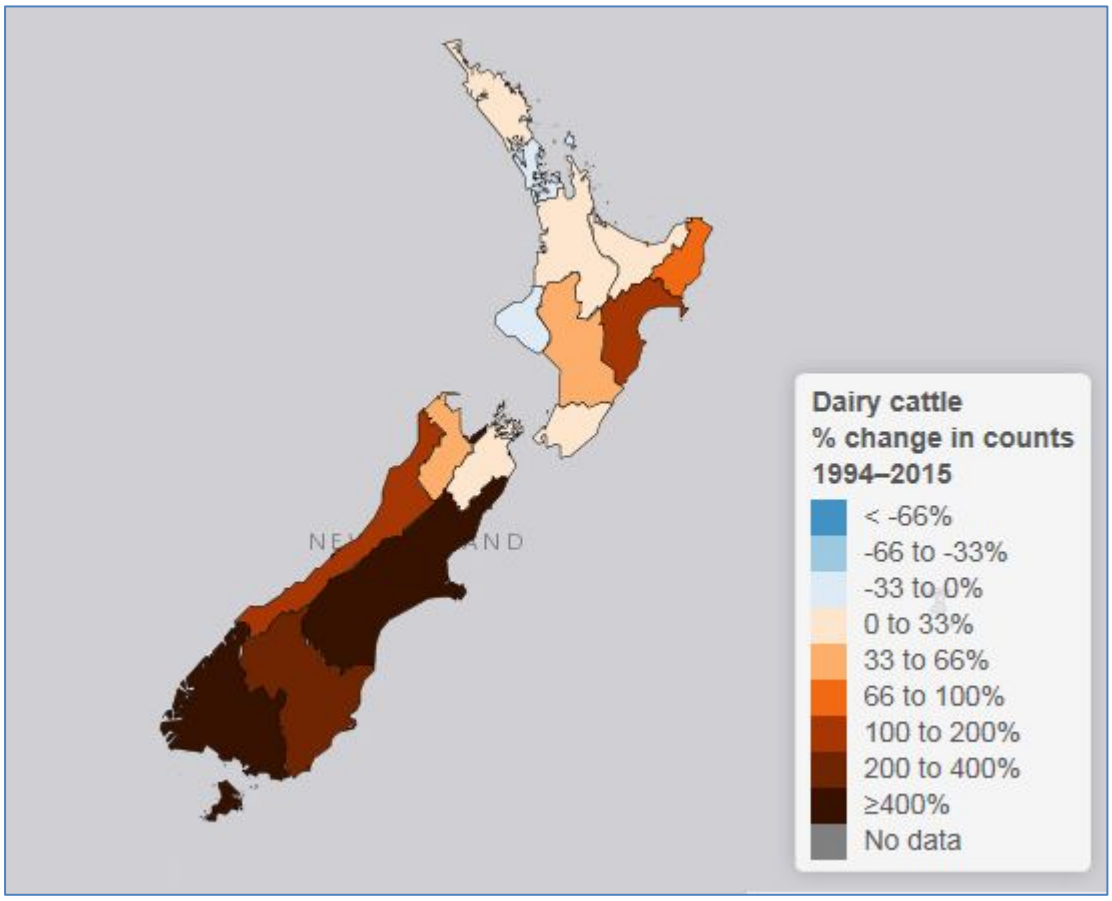
ICAR THE GLOBAL STANDARD FOR LIVESTOCK DATA

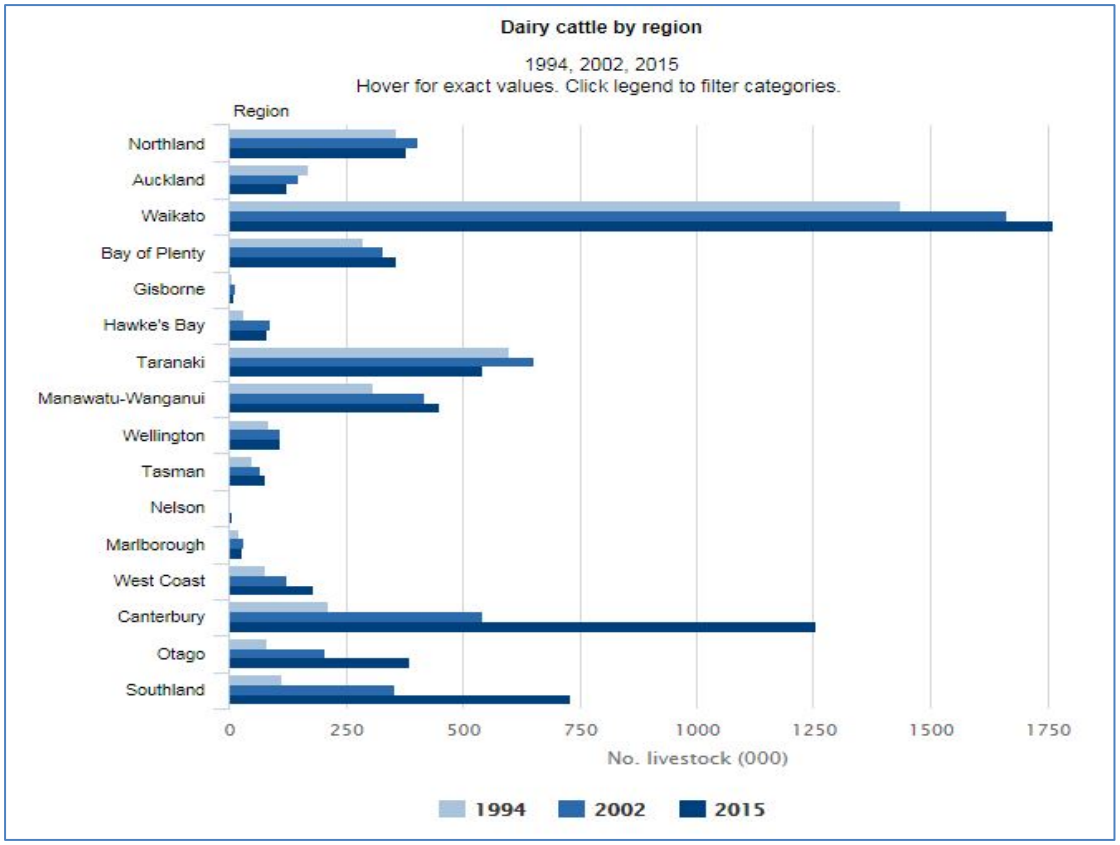
二、主辦國紐西蘭畜牧業

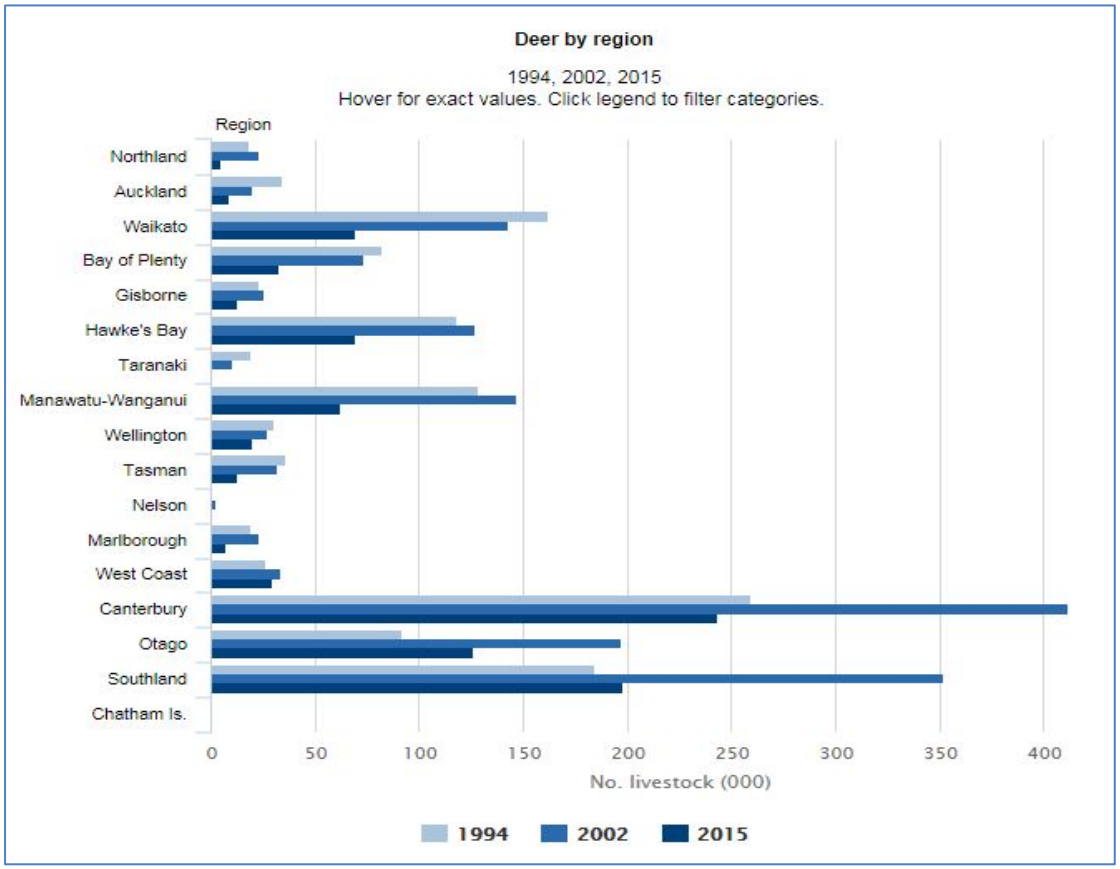
主辦國紐西蘭的乳牛產業有480萬頭泌乳牛(是我國的100倍之多)，11,748場乳牛戶，每場平均有414頭泌乳牛，泌乳牛牛群規模大，年產總乳量達2,100,000萬公噸牛乳(是我國的56倍之多)，顯示紐西蘭草原放牧乳牛之產乳量低於台灣圈養型乳牛產乳量。與乳製品運銷有關人員也高達47,310人，造就紐西蘭為乳業先進國家。畜牧業是紐西蘭廣泛使用的土地，並有助於經濟發展。在2017年飼養了2,737萬隻羊，1,008萬頭牛（361萬頭肉牛和647萬頭乳牛）和85萬頭鹿，家畜飼養數量多和其分佈會影響土地生物多樣性和土壤肥力。高密度飼養牛隻也會影響水質，因為尿和糞便中的氮和細菌會滲入地下水或流入河流和湖泊。紐西蘭的家畜（如肉牛、乳牛、鹿、羊）數量的變化及其各地區飼養量的分佈圖。乳牛總數從1994年的384萬頭增加68.6%至2017年的647萬頭。然而，從2012年起，這一增

加率放緩至0.45%(由2012年至2017年增加28,826頭)，同時期所飼養的羊、鹿和肉牛數量下降的速度也有所減緩。在2016年，懷卡托區（Waikato 1,855,170頭）和坎特伯雷（Canterbury 1,271,057頭）的乳牛數量最多，以及塔拉納基(Taranaki)的部分地區的牛群密度也最高。從2012年至2016年期間，坎特伯雷區（增加5.90%），懷卡托區（增加1.24%）和南部地區（增加5.7%）的乳牛頭數增加，而同期塔拉納基下降8.08%。馬納瓦圖及旺加努伊(Manawatu-Wanganui)在2012年至2016年期間綿羊數量下降了10.20%，但2016年仍是綿羊數量最多的地區(5,040,174頭)。









Statistics NZ (2015). Agricultural production statistics: June 2015 (final). Retrieved from www.stats.govt.nz.

三、參訪紐西蘭乳牛場

主辦單位主席Hugh Blair教授宣布出席人數總計有1,423人，來自70個國家，台灣有5位(畜試所2、屏科大2及中興大學1)參加。日本、韓國、中國、菲律賓、泰國、印尼及印度分別有25、16、16、5、4、1及7人參加。美國188人、紐西蘭160人、澳大利亞149人、荷蘭80人及法國73人為最大團的前五國。大會於2月14日安排10個畜牧產業發展參訪團行程，總計有696人參加，台灣成員各有兩位參加種乳牛場發展團與養鹿產業團。參觀LIC的創新農場，觀看農場技術的最新動態與有關農業系統的互動。在商業乳牛場聽取農民的意見，並觀看他們的精英牛。參觀荷蘭CRV育種公司在紐西蘭設置的最先進的乳牛精液凍存設施，並參訪公牛飼養廠區與頂尖的繁殖公牛會面。參訪人員需要知道的事情：

1. 生物安全非常重要 - 非常感謝您的合作。
2. 請穿乾淨，堅固的鞋子，以便在到達和離開每個場地（有提供消毒劑）時噴灑/擦洗。當你到達大多數場館時，將在公共汽車上提供靴套 - 請保持你的鞋子覆蓋，直到你回到車上。
3. 請勿觸摸動物 - 動物將在大多數場館展出，請勿觸摸它們。
4. 天氣可能會非常熱 - 但可能會傾盆大雨！ 穿上熱衣服，但裝一件雨衣。
5. 如有食物過敏/要求 -希望所有與食物過敏/特殊要求的代表在同一輛公共汽車上，以便確保您得到適當的照顧。










參觀養鹿和羊(終端公羊和母羊群)產業團，會聽到重點遺傳學和AgResearch工作人員討論他們的育種計劃，包括重點遺傳學雄鹿育種計劃、DNA親子鑑定、選種流程、和通過比對DNA親本，品種組成和基因組學選擇進行測序引入基因分型。綿羊包括終選父母群體，用於生長，肉量生產和肉類質量，及有關於他們的基因組選擇計劃的討論，並為母畜選種計劃進行類似的研談。

四、會議重點活動

國際畜政聯盟的轄下有4個執行工作委員會(SC)：Recording Devices(記錄儀器委員會)、Animal Identification(動物標識委員會)、Milk Analysis(乳質分析委員會)及Interbull(國際種公牛協會)，以及因需求而設置工作推動小組(WG)與專項運作小組(TF)等。這次會議也修正國際畜政聯盟轄下4個執行工作委員會(SC)及重組的10個工作推動小組(WG)成員，總計有160位國際專家為委員或組員，以及分別條列出SC及WG的近一年優先項目66個及下年度主要議題65個，要發揮ICAR的國際多功能服務。根據準則和服務規範，發給適用ICAR指引的560種動物檢測器具、58個乳量計檢核實驗室、45個基因及乳質分析實驗室。

黃振芳所長在ICAR理事會主席Jay Mattison博士推薦下，以觀察員出席最新成立Feed and Gas WG(飼料與溫室氣體工作推動小組)，研商新世代畜牧場經營規

範，來提高飼料效率及降低畜牧業衍生的溫室氣體。而吳明哲組長以觀察員第四年參加ICAR之綿羊山羊駱駝發展組(SGC WG)之性能檢定規範會議。於2月11日至16日出席第11屆遺傳學應用於畜牧生產國際論壇(WCGALP)，並代表我國參與「豬基因體圖譜發展史編撰組Pig Genome History」(英國Ann Bruce教授主導)。國際畜政聯盟秘書處與全球運籌組已同意於2018年安排到台灣、菲律賓及越南，進行三國聯訪區域會議，將Recording Devices(記錄儀器委員會)、Animal Identification(動物標識委員會)及Milk Analysis(乳質分析委員會)之優先重點列入推動東亞洲區域服務主軸，促使最先進科技可廣泛地被東協畜牧產業加以應用的科技普及化。

自2017年愛丁堡會議以來，ICAR策一直致力於為會員國提供更好的服務。努力的重點放在了ICAR檢測/認證行動計劃中確定的策略活動上。與牛乳檢測儀器的檢測/認證相比，識別設備的檢測效率更高。在牛乳乳質分析中，3月和9月每年進行兩次熟練測試（PT）。在2018年，全球約有70家參考和常規實驗室參加了ICAR PT，清楚地表明ICAR成員的興趣。作為PT的推動報告是牛乳分析實驗室經理識別如何提高其準確性的有效工具。與此同時，牛乳分析小組委員會制定了新的牛乳分析儀認證指南，以促進對儀器質量的認可。

DNA解譯中心的認證已經制定，並且已經授予了基因實驗室的第一批認證。在動物生產領域建立一個不間斷的認證鏈，尤其是分子途徑的策略是創建Interbull中心提供的GenoEx PSE服務的原因，該服務目前正在測試中，預計將在2018年夏季重新開始。GenoEx-PSE的主要功能是為基因分型動物交換SNP的標準化集合以便於授權服務用戶進行親子分析活動GenoEx-PSE服務。與此同時，乳牛和肉牛國際遺傳評估的常規提供仍然是Interbull和Interbeef小組的核心重點。

自ICAR在愛丁堡召開會議以來，對ICAR成員的儀器商之檢測記錄器具進行了兩次協商性審查會議。質量證書計劃進入繁忙期，計劃於2018年進行14次審計和6次協商審查會議，而計劃也正在進入更新階段，評估程序適合採用“過程方法”，其基礎是機器人科技風險正在到影響ICAR成員的儀器商之傳統性檢測記錄器具應用面。

ICAR未來一年的策略和重點包括“ICAR指南項目第二階段”，新服務的“鋪墊”一個更新的身分辨識器測試方法，合理化的牛乳分析設備認證，擴大參與的DNA數據解釋中心信息技術的認證和最終確定能根據通用數據進行升級保護監管（GDPR）歐盟立法。

ICAR是歐盟資助的名為SMARTER的項目的合作夥伴之一，該項目預計將於2018年11月舉行啟動會議.ICAR所涉及的包裹的監督將由綿羊、山羊和小駱駝

工作組主席Jean-Michel Astruc負責管理。SMARTER將採用新的合作策略來提高動物（A），種群/品種（P）和系統/農場（S）水平的綿羊和山羊部門的韌性和效率（R&E）。 SMARTER的總體目標是：

1. 分析表型和基因特徵和理解新型R＆E相關特徵
2. 改進和開發新的基因組預測技術
3. 建立新的育種和管理(包括那些新型R＆E的策略)，並根據各種系統，品種和環境的重要性和相關性來確定相關性狀。

遺傳學應用於畜牧生產國際論壇(WCGALP)有物種應用、養殖學、遺傳改良目標、改良方法與工具、分子遺傳應用、理論產業化過程、新穎科技、產業問題解決、知識庫應用、及前瞻性議題等10個主題873篇研究報告，之中有38篇為前瞻性議題。

- 從機器學習到深度學習
- GWAS、CNV和選擇簽名的整合揭示了雞群腹部脂肪調節的候選基因
- 蛋白質的限制性改變杜洛克x伊比利亞雜交豬生長期不同階段的肝轉錄組
- 選擇大西洋鮭魚肌肉中的脂肪酸組成
- 熱應激過程中，肉類鳥類中基因和抗氧化酶活性的分子和細胞機制
- 使用BayesC進行全基因組關聯研究評估布氏瑞士犢牛吸吮反射的遺傳參數
- 從斷奶到成熟的肉牛品種生長模型
- 肉類生產週期中肉類儲備的聚類和遺傳分析發生變化
- 國際基因組評估的SNP MACE模型：技術挑戰和可能的解決方案
- 用於大規模基因組評估的單步主成分嶺回歸模型
- 將單步ssGBLUP擴展到許多基因型個體
- 用於解決單步單核苷酸多態性BLUP的減縮預處理共軛梯度法
- 方差分量估計中的高效塊-吉布斯採樣於結合表型信息和基因組信息的預測
- 數值有效的完全正交化的單步SNP-BLUP
- 使用譜系或單步基因組學方法對牛估計育種值之間的對比精確度
- 美國荷斯坦牛生產性狀的單步GBLUP預選偏倚和驗證方法
- 使用表達數據檢測乳牛的小QTL
- 丹麥荷斯坦乳牛高值乳蛋白和乳清與酪蛋白比率的遺傳參數估計
- 美國荷斯坦乳牛生產和健康特性的耐熱性遺傳分析
- 使用胸部超聲波技術開發斷奶前牛犢中牛呼吸道疾病的基因組參考群體
- 在四個法國和北歐奶牛品種中使用全基因組密集SNP探索非加性方差
- 育種計劃中的近交繁殖的基因組管理
- 荷蘭-弗蘭德荷斯坦黑白花牛的基因組選擇和近交以及親緣關係
- 基因組信息的有限維度和有效人口規模
- 標記和表型個體之間基因組相似性的貝葉斯推斷
- 使用內點算法優化遺傳貢獻的一般二次規劃方法

- 有效種群規模的概念在使用分子標記進行多樣性最優化管理的背景
- 選擇“遺傳優先”方法
- 丹麥荷斯坦和丹麥澤西的傅里葉變換紅外乳品譜的遺傳分析
- 使用貝葉斯混合模型對哺乳期牛乳脂肪酸縱向數據依賴性全基因組關聯作圖
- 基於荷蘭，丹麥和中國乳牛的全合成乳脂肪酸的全基因組關聯研究
- 意大利荷斯坦乳牛的β-羥基丁酸奶的遺傳方面
- 使用中紅外光譜分析北美荷斯坦牛的全基因組關聯分乳中的β-羥基丁酸濃度
- 使用牛乳體細胞和脂肪中的16s rRNA基因測序分析牛乳微生物譜
- 基因組學在準確預測生豬養殖方面的附加價值：從歷史數據中學習
- 使用空間聚類和非線性優化檢測基因型樣本中的人口分層
- 用基因組模型獲得配子多樣性的變異
- SNP子集對總遺傳值預測準確性的影響
- 水貂中的基因組選擇使用貝葉斯方法比GBLUP模型產生更高的準確性
- 結合異質性的全國數據預測乳牛代謝物中的腸道甲烷

肆、建議事項

一、國際畜政聯盟大會宣佈於2019年6月17至21日由捷克主辦ICAR會員國科技會議，荷蘭主辦2020年會員國大會暨執行委員工作會議。WCGALP理事長Hermann Swalve教授(德國)於閉幕典禮宣佈第12屆WCGALP於2022年7月3至8日在荷蘭鹿特丹市舉辦。我國應持續派員參加國際畜政聯盟(ICAR)工作小組及第12屆遺傳學應用於畜牧生產國際論壇(WCGALP)，取得種畜禽動物性能紀錄感測器最新情況及參訪主辦國最先進乳牛精液產製銷儀器與檢測方法。

二、借鏡紐西蘭重視水資源環境及活體動物瘦肉量電腦斷層掃描高科技應用，促進我國畜牧產業能朝此國際趨勢發展。

三、配合國際畜政聯盟秘書處與全球運籌組於2018年安排到台灣、菲律賓及越南，進行三國聯訪區域會議，推動東協畜牧產業。

伍、附錄(會議活動資料及圖檔)

一、有關國際畜政聯盟(ICAR)資料

(一) 國際畜政聯盟(ICAR)章程

ICAR 今天是動物記錄和生產力評估標準化的全球性組織。其目的是通過制定經濟重要性狀測定的定義和標準，促進農場動物記錄和評估的改進。

ICAR 的使命是通過自己無法自己高效的行動為其成員組織提供福利：

- 提供幫助成員組織開發，運營和管理業務的信息和服務。
- 提供信息和服務，促進記錄和評估的好處，從而增加對 ICAR 成員組織提供的服務的需求。
- 提供和標準，促進國家和國際成員組織提供服務和交流信息。
- 提供一個機構，成員組織可以通過這個機構共同努力實現共同目標。

ICAR 作為註冊非營利性 INGO 的現有結構規定其成員充分參與其中的開發工作，並建立在可靠的科學依據的基礎上。指南是為確保成員國之間令人滿意的記錄一致性而設定的最低要求，並且在選擇方法方面具有最大的靈活性。

ICAR 於 1951 年 3 月在羅馬創立，是一個小型的區域性組織，近年來發展成國際地位。實際規定制定如下：

- 大會決定授權理事會進行這種登記，並根據“法律法”對“章程”進行細微修改; 羅托魯瓦（新西蘭）1998 年 1 月 22 日。
- 理事會批准擬議的章程; 巴黎（法國）1999 年 3 月 5 日。
- 宣布並向警察局登記新的章程; 巴黎（法國）1999 年 3 月 29 日。
- 法國共和國承認協會於 1901 年已註冊; 一九九九年四月十九日。
- 出版於 1999 年 5 月 15 日第 20 期“日刊”。
- 2000 年 5 月 16 日，大會最後通過斯洛文尼亞布萊德。
- 於 2006 年 6 月 9 日由芬蘭庫奧皮奧大會修改並獲得批准。
- 於 2008 年 6 月 20 日在美國尼亞加拉瀑布大會修改並獲得批准。
- 2008 年，美國尼亞加拉瀑布大會批准將 ICAR 的所在地從巴黎（法國）移至羅馬（意大利）。註冊於 2008 年 7 月 28 日在意大利羅馬 5，第 17597 號。
- 於 2012 年 6 月由愛爾蘭科克舉行的大會修改並獲得批准。
- 於 2013 年 6 月在丹麥奧胡斯召開的大會修改並獲得批准。
- 於 2015 年 6 月在波蘭克拉科夫舉行的大會修改和核准。

(二)2018 年理事會組成

國際畜政聯盟(ICAR)理事會由最多 11 人組成。理事會的五名成員（主席，兩名副主席，財務主管和秘書）構成執行委員會。兩名檢查員和行政官不應成為理事會的一部分，但應邀請參加理事會會議。2018 年理事會成員如下：

主席: Jay Mattison 美國國家乳業改良協會(National Dairy Herd Improvement Association, 421 S Nine Mound Road PO Box 930398, 53593-0398 Verona, WI, USA)	
副主席: Daniel Lefebvre 加拿大(555 boul. Des, Anciens-Combattants Sainte-Anne-de-Bellevue, QC Canada)	
副主席: Niels Henning Nielsen 丹麥牛聯合會(RYK, Danish Cattle Federation Udkærsvej 15, Skejby 8200 Århus N, Denmark)	
理事: Kaivo Ilves 愛沙尼亞動物記錄中心(Estonian Animal Recording Center Kreutzwaldi st. 48A, Tartu, Estonia)	

財務主管: Laurent Journaux 法國(France Genétique Elevage 149, Rue de Bercy Paris Cedex 12, France)	
理事: Bevin Harris 紐西蘭(LIC, Animal Evaluation Unit Private Bag 3016 Hamilton, New Zealand)	
理事: Jorge Lama 智利(COOPRINSEM Manuel Rodriguez 10405310696 Osorno, Chile)	
秘書: Bianca Lind 德國(Arbeitsgemeinschaft Deutscher Rinderzüchter e.V. (ADR) Adenauerallee 174 Bonn, Germany)	
理事: Japie van der Westhuizen 南非(SA Stud Book and Animal Improvement Association Posbus 270 Bloemfontein, South Africa)	

理事: Antonio Martins 葡萄牙(ANABLE Apartado 522 4481 – 908 Vila do Conde Portugal)	
理事: Frido Hamoen 荷蘭(CRV P.O. Box 454 6800 AL, Arnhem The Netherlands)	
ICAR 行政官: Martin Burke	
檢查員: Josef Kucera 捷克(Czech Moravian Breeder's Corporation Inc. Czech Republic)	
檢查員: Neil Petreny 加拿大(Canadian DHI c/o Ontario DHI, 660 Speedvale Av. W., Suite 101, N1K 1E5 Guelph, Ontario, Canada)	

二、國際畜政聯盟(ICAR)暨第 11 屆遺傳學應用於畜牧生產國際論壇(WCGALP)會議議程及專題演講題目

ICAR Plenary: ICAR Global Guidelines
Feb 10, 2018 (11:00 AM–12:30 PM)

The importance of farm systems thinking in animal recording Bruce Thorrold	PPT	Abstract
Increasing dairy farm profitability in a changing world of herd demographics Robert Fourdraine	PPT	Abstract
International beef breeding; Challenges and Opportunities Andrew Cromie	PPT	Abstract
France Génétique Elevage management quality system: an example of multi companies system, to serve a community of organizations, based on ISO 9001 standard Laurent Journaux	PPT	Abstract
ICAR and sensor devices – a progress report on the development of ICAR guidelines for certification, routine maintenance/calibration and data usability standards for sensor devices for livestock Steven Sievert	PPT	Abstract

Services/Servicing Laboratories: Quality Assurance Tools
Feb 10, 2018, 1:30 PM–3:30 PM

ICAR services for Quality Assurance in milk analyses Silvia Orlandini	PPT	Abstract
Independent validation and certification of analytical methods Vesela Tzeneva and Harrie van den Bijgaart	PPT	Abstract
Quality Assurance Tools in Milk-Testing Laboratories– The View of an Instrument Manufacturer Daniel Schwarz	PPT	Abstract
Presentation of a new system to monitor and stabilize mid infrared spectral data Frédéric Dehareng	PPT	Abstract
The unfolding of new analytical concepts – managing expectations, challenges and disappointments Christian Baumgartner	PPT	Abstract

Services/Recording Device Testing
Feb 10, 2018 , 4:00 PM–5:30 PM

Moving from approval to certification for recording and sampling devices by ICAR – a dynamic approach to connect member organizations and manufacturers while encouraging innovation and testing of new devices Steven Sievert	PPT	Abstract
Integration of routine computerized monitoring solutions for milk meter performance into the services offered by milk recording organizations as a tool for improved dairy	PPT	Abstract

producer service and satisfaction Bruce Dokkebakken		
Analysis of the accuracy of a method for estimating 24-hour fat percentage and yields) with robots protocols and one single sample Laurent Journaux	PPT	Abstract
Comparison of a flourometric and a fat-content-based method to measure carry-over in milking systems Christian Ammon	PPT	Abstract

Workshop on "Udder health"

- Use of SCC data for selective dry cow therapy
  Scott McDougall
- Using Data in a Pasture Based Seasonal System
  Jess Spatz Shelgren
- Strategic Udder Health Monitoring and Benchmarking based on national SCC data in Germany
  Christian Baumgartner
- ICAR and IDF closing the gap in global equivalence with somatic cell counting in milk
  Silvia Orlandini
- Progress with Reduction in Antimicrobial Drug Use in Dutch Dairy Cattle
  Harrie van den Bijgaart

11 February, 2018
Technologies & Tools: Sensor Devices
Feb 11, 2018 , 8:30 AM–10:30 AM

Milk recording – where we came from and where we are headed Uffe Lauritsen	PPT	Abstract
Comparison of individual cow SCC estimates using an on-line SCC analyser and conventional herd tests Rob Orchard	PPT	Abstract
Update on development of validation criteria for sensor devices Harrie van Den Bijgaart	PPT	Abstract
Characterization of milk composition and somatic cell count estimates from automatic milking systems sensors Daniel Lefebvre	PPT	Abstract
Comparison of on-line SCC analysers and herd testing for estimating mastitis detection rates Irene Lingjun Zhang	PPT	Abstract
Morpho 3D: a new device to register and analyze 3D shapes of animals Laurent Journaux	PPT	Abstract

Workshop: Identification, Meat & Reproduction Recording in Sheep & Goat in ICAR Member Countries 1
Feb 11, 2018, 8:30 AM–10:30 AM

Survey Results Joanne Conington	PPT	Abstract
The value live animal and carcase scan traits for the genetic selection of lean meat yield in lamb Daniel Brown	PPT	Abstract
The NZ Sheep Genetic Evaluation – Reproduction and Meat Sharon Mcintyre	PPT	Abstract
Breeding for meat sheep in France Jean-Michel Astruc	PPT	Abstract
Perspectives of the selection scheme of the Sarda dairy sheep breed in the era of genomics Sotero Luca Salaris	PPT	Abstract
Relationship between somatic cell count and other udder phenotypes in dairy sheep Gilles Lagriffoul	PPT	Abstract

Data/Data Standards and Data Exchange Protocols
Feb 11, 2018, 11:00 AM–12:45 PM

Animal Data Exchange Working Group Update Robert Fourdraine	PPT	Abstract
Data transfer and data protection issues Christa Egger-Danner	PPT	Abstract
DataLinker: Permissioned exchange of livestock data Andrew Cooke	PPT	Abstract
The automation of data collection from on farm software Tony Craven	PPT	Abstract
Voice activated mating data capture Tony Francis	PPT	Abstract
Smooth and dynamic data exchange between farms and Milk Recording organizations and the lab machines Harm-Jan van der Beek	PPT	Abstract
Nordic Cattle Data eXchange – a shared standard for data transfer Juho Kyntäjä	PPT	Abstract

Technologies: Milk testing inc. spectral analysis 1
Feb 11, 2018 , 11:00 AM–12:30 PM

Development and Field Use of Mid Infrared Spectra to Measure Milk Fatty Acid Parameters and Estimated Blood NEFA for Farm Management Dave Barbano	PPT	Abstract
Detailed milk compositional analysis by FTIR Steve Holroyd	PPT	Abstract
The new CombiFoss™ 7 DC – An Update on Differential Somatic Cell Count and other Advancements in Milk Testing Daniel Schwarz	PPT	Abstract

A landscape of the heritability of single-band Fourier-Transform Infrared spectra data in Canadian Holstein Gabriel Rovere	PPT	Abstract

Workshop: Identification, Meat & Reproduction Recording in Sheep & Goat in ICAR Member Countries 2
Feb 11, 2018

Electronic and visual identification for sheep and goats in Brazil Alda Monteiro	PPT	Abstract
Application of 12 STR markers for the evaluation of genetic variation in sheep Anna Radko	PPT	Abstract

Global Initiatives
Feb 11, 2018 , 1:30 PM–3:30 PM

Designing a Support System in Decision Making for Better Management of Livestock Production Pramod Rout	PPT	Abstract
The C.O.W. culling tool comparison between test-day model and 305-d model proofs for dairy cows Margaret Kelleher	PPT	Abstract
Challenging Concept for Tropical Sire Summary Monchai Duangjinda	PPT	Abstract
Genetic and phenotypic parameters for feed and water efficiency in Senepol cattle Gilberto Menezes	PPT	Abstract
Evaluation of infestation level of cattle by the tick Rhipicephalus microplus in New-Caledonia – Test of a new assessment grid Michel Naves	PPT	Abstract
First national recording of health traits in dairy cows in the Czech Republic Zuzana Krupová	PPT	Abstract
A recent research and development at International Genetic Solutions on discovery of novel functional variants affecting growth traits in beef cattle Mahdi Saatchi	PPT	Abstract
Use of Plausibility Checks in Milk Recording Organisations Juho Kyntäjä	PPT	Abstract

Services: Implications of Recent Developments for Breed Associations 1
Feb 11, 2018 , 1:30 PM–3:30 PM

See the Change, Be the Change: Overcoming Roadblocks to Innovation in the New Zealand Beef Cattle Breeding Industry Caren Bailey	PPT	Abstract

Implications of Recent developments for Breed Associations – World Guernsey Cattle Federation Courtney Walker	PPT	Abstract
EU Animal Breeding Regulation Johannes Venneman	PPT	Abstract
Documenting Changes in Dairy Breeds in the United States including Genomic Examinations with Breed Base Representation Duane Norman	PPT	Abstract
Identification and characterization of two new recessive embryonic lethal mutations in Holstein cattle Clementine Escouflaire	PPT	Abstract
Management of genetic trait information in the genomic era Tom Lawlor	PPT	Abstract

Technologies: Milk testing inc. spectral analysis 2
Feb 11, 2018 , 1:30 PM–3:30 PM

Association of MIR-derived energy traits with fertility parameters in dairy cows Stephanie Smith	PPT	Abstract
Prediction of blood β-hydroxybutyrate content in early-lactation New Zealand dairy cows using milk infrared spectra Valentina Bonfatti	PPT	Abstract
Prediction of Serum Metabolic Profile Biomarkers in Early Lactation Dairy Cows Using Mid-Infrared Spectroscopy of Milk Tim Luke	PPT	Abstract
Accuracy of genomic predictions for GC measured and MIR predicted fatty acid composition of sheep milk Nicolo Macciotta	PPT	Abstract
Milk mid-infrared spectra based biomarkers contributing to genetic improvement for udder health, fertility and longevity Nicolas Gengler	PPT	Abstract
Defining and using novel milk composition based heat stress resilience traits in the context of genomic selection for more robust dairy cows in Wallonia Rodrigo Reis Mota	PPT	Abstract

Plenary Session

- From machine learning to deep learning
  Jeremy Howard

Biology – Growth and Development – Joint with ICAR

- Integration of GWAS, CNV and selection signature reveals candidate genes for abdominal fat regulation in chickens
  Luiz Lehmann Coutinho
- Protein restriction modifies differentially the liver transcriptome at different stages of the growing period of Duroc x Iberian crossbred pigs
  Maria Muñoz
- Selection of fatty acid composition in muscle of Atlantic salmon
  Siri Horn
- Molecular and cellular mechanisms that underlie genes and antioxidant enzyme activities in meat-type birds during heat stress
  Samuel Aggrey
- Genome-wide association studies using BayesC and estimation of genetic parameters for perinatal sucking reflex in Brown Swiss calves
  Clarissa Dreher
- Modelling Growth from Weaning to Maturity in Beef Cattle Breeds
  Madeline Zimmermann
- Clustering and genetic analysis of body reserves changes throughout productive cycles in meat sheep
  Tiphaine Macé

Method and Tools – Models and Computing Strategies – Joint with Interbull

- A SNP MACE model for international genomic evaluation: technical challenges and possible solutions
  Zengting Liu
- A single-step principal component ridge regression model for large-scale genomic evaluations
  Jorgen Odegard
- Extension of single-step ssGBLUP to many genotyped individuals
  Ignacy Misztal
- Deflated preconditioned conjugate gradient method for solving single-step single nucleotide polymorphism BLUP
  Jeremie Vandenplas
- Efficient block-Gibbs sampling in variance component estimation for predictions which combine phenotypic and genomic information
  Viktor Milkevych
- Numerically efficient fully orthogonalized Single-step SNP-BLUP
  Matti Taskinen
- Accuracies of contrasts between estimated breeding values of selection candidates from national cattle evaluations using pedigree or single-step genomic methodology
  Daniel Garrick

Biology & Species – Bovine (Dairy) – Joint with ICAR

- Pre-selection bias and validation method in single-step GBLUP for production traits in US Holstein
  Yutaka Masuda
- Using expression data to detect small QTL in dairy cattle
  Irene van den Berg
- Genetic parameter estimation of high value milk proteins and whey to casein ratio in Danish Holstein
  Nina Aagaard Poulsen
- Genetic analysis of heat tolerance for production and health traits in US Holstein cows
  Anil Sigdel
- Development of a genomic reference population for bovine respiratory disease in pre-weaning dairy calves using thoracic ultrasonography
  Allison Quick
- Exploring non-additive variance using genome-wide dense SNP in four French and Nordic dairy cattle breeds
  Andrew Marete

Theory to Application – Joint with ICAR

- Experiences with large scale implementation of genomic selection in a predominantly crossbred beef population
  Ross Evans
- Implementation of single-step genomic BREEDPLAN evaluations in Australian beef cattle
  David Johnston
- Genomic selection in practice in French Lacaune dairy sheep
  Diane Buisson
- Stronger measures of genomic connectedness enhance prediction accuracies across management units
  Gota Morota
- Weighted single-step GBLUP improves accuracy of genomic predictions for traits controlled by major gene or QTL in French dairy goats
  Marc Teissier
- The impact of utilizing previous generations of genotyped animals in genomic selection
  Jeremy Howard
- A new dairy cattle mating advice for Ireland which incorporates genomic information
  Tara Carthy
- Enhancing genetic disease control by selecting for lower host infectivity
  Smaragda Tsairidou

Methods and Tools – Software – Joint with Interbull

- Wrestling with a WOMBAT: Selected new features for mixed model analyses in the genomic age
  Karin Meyer
- BLUPF90 suite of programs for animal breeding with focus on genomics
  Ignacio Aguilar

- Factors affecting phasing quality in a commercial layer population
  Nicolas Frioni
- An introduction to BOLT software for genetic and genomic evaluations
  Dorian Garrick
- GWAS and GS Are as Easy as Clicking and Dragging with iPat
  James Chen
- Echidna Mixed Models Software
  Arthur Gilmour
- Efficient single-step BLUP computations with MiX99 software
  Ismo Stranden
- JWAS: Julia implementation of Whole-genome Analyses Software
  Hao Cheng

Biology – Reproduction – Joint with ICAR

- Effects of conceptus sex and genetics on circulating thyroid hormones and IGFs in heifers at mid gestation depend on maternal genetic background
  Stefan Hiendleder
- Meiotic Recombination in Ruminant Livestock Species
  Brenda Murdoch
- Deciphering the role of vaginal and sperm metagenome in the success of artificial insemination in sheep
  Magdalena Serrano
- Application of Metabolomics on Selecting for Litter Size in American Mink (Neovison vison)
  Shannon Spencer
- Genomic analysis of reproductive traits in health challenged commercial sow herds
  Cassandra Ferring
- Genome-Wide Associations for Progesterone Profiles in Holstein-Friesian Cows
  Sofia Nyman
- Identification of unfavourable homozygous haplotypes associated with with milk and fertility traits in Holsteins
  Gabriele Marras

Method and Tools – Prediction – Joint with Interbull

- The use of multi-breed reference populations and multi-omic data to maximize accuracy of genomic prediction
  Mike Goddard
- Using RNAseq data to improve genomic selection in dairy cattle
  Thomas Lopdell
- The use of sequence SNP in a marker model for an across-breed dairy cattle genomic evaluation
  Bevin Harris
- Using additional single nucleotide polymorphisms selected from whole genome sequence data for genomic prediction in Danish Jersey
  Aoxing Liu

- Genomic evaluation based on selected variants from imputed whole-genome sequence data in Australian sheep populations
  Nasir Moghaddar
- Exploiting sequence variants for genomic prediction in Australian sheep using Bayesian models
  Majid Khansefid
- Use of causative variants and SNP weighting in a single-step GBLUP context
  Breno De Oliveira Fragomeni

Biology – Disease Resistance – Joint with ICAR

- Estimation of genomic breeding values for the susceptibility to digital dermatitis in Holstein dairy cattle using improved methods for phenotyping
  Hermann Swalv
- Genome-wide association study and functional analysis of infectious and horn type hoof lesions in Canadian Holstein cattle
  Francesca Malchiodi
- Genetic analysis of calf vitality, survival and disease resistance in Charolais beef cattle
  Florence Phocas
- ChronMast – a model to study functional genetic variation of mastitis susceptibility
  Christa Kuehn
- Detection of candidate regions affecting bovine IgM natural antibodies in milk
  Juan Cordero-Solorzano
- Genome-Wide Association and Functional Annotation of Positional Candidate Genes for Immune Response in Canadian Holstein Cattle
  Bonnie Mallard
- Genome-wide associations of immune-associated traits in dairy cows
  Scott Denholm
- Genome-wide association study and gene network analysis of fertility, retained placenta, and metritis in US Holstein cattle
  John Cole

Plenaray Session

- The Sailing Larder: Using ancient DNA from commensal animals to reconstruct Pacific prehistory and migration pathways
  Lisa Matisoo-Smith

Challenges – Environmental ASB – Joint with ICAR

- Where have we come with breeding for methane emissions – update from international collaborations
  Yvette de Haas
- Microbiability– new insights into (genetic) modelling methane emissions of cattle
  Gareth Difford
- Heat stress tolerance indicators to be used as phenotypes in GWAS analyses: a comparison study in dairy cattle.
  María J. Carabaño

- Meta-analysis of heritability estimates for methane emission indicator traits in cattle and sheep
  Luiz Brito
- Genetic architecture of methane emissions from dairy cows
  Marcin Pszczola
- Genetic relationships between methane emission and milk yield, live weight and dry matter intake
  Irene Breider
- Herds of high genetic merit for maternal beef traits are more carbon efficient than herds of lower genetic merit.
  Andrew Cromie
- Predicted economic and greenhouse gas benefits from using improved maternal genetics in UK beef cattle
  Cheryl Quinton

Species – Bovine (Beef) – Joint with ICAR

- Accuracy of genomic predictions for carcass and meat quality traits in the Uruguayan Hereford breed
  Elly Navajas
- Runs of homozygosity and evidence of adaptation in Nellore cattle
  Elisa Peripolli
- The potential of genotyping pooled DNA to leverage commercial phenotypes for genetic improvement of beef cattle
  Ricardo Ventura
- Using Commercial Data and Genomics to Improve Female Fertility and Calf Survival of Limousin beef cattle in the UK
  Kirsty Moore
- Copy number variations and quantitative trait loci in South African Brahman cattle.
  Magretha Wang
- Use of genetic variance to determine weighting factors for genomic information used in single step genomic evaluation
  Yuandan Zhang
- Single-step genomic BLUP for national beef cattle evaluation in US: from initial developments to final implementation
  Daniela Lourenco

Methods and Tools – GWAS – Joint with Interbull NZI

- Linkage disequilibrium pattern and genome-wide association mapping for meat traits in multiple porcine F2-crosses
  Patrick Stratz
- Genome-wide association study of meat quality traits using whole-genome sequence data in a multi-breed sheep population
  Gerson Oliveira Junior
- A rapid method for the identification of epistatic ‘dormant’ SNPs
  Toni Reverter

- Exploiting the network-based association weight matrix approach for the genetic dissection of milk nitrogen fractions in dairy cattle
  Enrico Santus
- Genome-wide association study for male and female reproductive performance indicator traits in Nellore cattle
  Gerson Oliveira Junior
- Identification of causal variants using one million individuals with whole–genome sequence information
  Janez Jenko
- Selecting sequence-derived variants for prediction of genomic merit
  Ric Sherlock
- A genomic region on chromosome 17 has a major impact on litter size traits in rabbits
  Samuel Sosa Madrid

Biology – Disease Resistance – Joint with ICAR

- Genetic architecture of resistance to virulent ovine-footrot in a case-control study of New Zealand Merino sheep
  Herman Raadsma
- Somatic cell count-based selection reduces susceptibility to negative energy balance during early lactation
  Rachel Rupp
- Genome-wide association for facial eczema tolerance in New Zealand sheep
  Suzanne Rowe
- Variation in ovine RAS Guanyl Releasing Protein 1 (RASGRP1) gene and its association with flystrike in New Zealand sheep
  Lucy Burrows
- Improving dairy ewes resistance to gastro-intestinal parasites in natural conditions by selecting rams in artificial infections.
  Sophie Aguerre
- The Effects of Vaccination and WUR Genotype on Blood Gene Expression Response to Co-infection with PRRSV and PCV2 in Pigs
  Jessie Dong
- Mortality Rate and Survival of Pigs Classified by Immune Response Phenotype Using the High Immune Response Technology™
  Julie Schmied
- Comparison of the transcriptome response within the porcine tracheobronchial lymphnode following viral infection
  Damarius Fleming

Biology – Feed Intake and Efficiency – Joint with ICAR

- Including feed intake data from U.S. Holsteins in genomic prediction
  Paul VanRaden
- Genomic prediction for feed efficiency: a validation of accuracy and its impact on methane emissions of dairy cows
  Phuong Ho

- Improving feed efficiency and net merit by including maintenance requirement in selection of dairy cattle
  Martin Lidauer
- Selection for low or high feed intake cows: genotype by environment interaction for milk yield, live weight and dry matter intake in dairy cows
  Roel Veerkamp
- Challenges and limitations for improving feed efficiency from metagenomics data
  Oscar Gonzalez-Recio
- The potential of using rumen microbial gene abundances to improve feed efficiency in beef cattle
  Rainer Roehe
- Genomic insights for feeding behavior traits in beef cattle
  Tiago Valente

Theory to Application – -Joint with ICAR

- Genomic management of inbreeding in breeding schemes
  Theo Meuwissen
- Genomic selection and inbreeding and kinship in Dutch-Flemish Holstein Friesian cattle
  Harmen Doekes
- Limited dimensionality of genomic information and effective population size
  Ivan Pocrnic
- Bayesian inference of genomic similarity among individuals from mark- ers and phenotypes
  Rohan Fernando
- A general quadratic programming method for the optimisation of genetic contributions using interior point algorithm
  Ricardo Pong-Wong
- The concept of effective population size loses its meaning in the context of optimal management of diversity using molecular markers
  Miguel Angel Toro
- A “genetics first” approach to selection
  Gary Bennett

Biology & Species – Bovine (Dairy) – Joint with ICAR

- Genetic analysis of Fourier transform infrared milk spectra for Danish Holstein and Danish Jersey
  Roos Zaalberg
- Lactation stage dependent genome-wide association mapping for longitudinal data of milk fatty acids in dairy cattle using Bayesian mixture models
  Bart Buitenhuis
- Genome-wide association study of the de novo synthesized milk fatty acids based on Dutch, Danish and Chinese Holstein Friesians
  Grum Gebreyesus
- Genetic aspects of milk β-hydroxybutyrate in Italian Holstein cows
  Anna Benedet

- Genome-wide Association Analysis for β-hydroxybutyrate Concentration in Milk Using Mid-Infrared Spectroscopy in North American Holstein Cattle
  Shadi Nayeri
- Analysis of milk microbial profiles using 16s rRNA gene sequencing in milk somatic cells and fat
  Juan Medrano
- 16S rRNA milk microbiota profiles on Holstein cows highlight QTL and provide a novel trait to assess the genetic regulation of mastitis
  Heather Huson
- Validation of candidate causative variants on milk composition and cheese-making properties in Montbéliarde cows
  Marie-Pierre Sanchez

Methods and Tools – Prediction – Joint with Interbull

- The Four Horsemen Of Genomicalypse: Fuzzy notions in genomic selection
  Andres Legarra
- On the added value of genomics for accurate prediction in pig breeding: learning from historical data
  Marcos Lopes
- On detection of population stratification in genotype samples using spacial clustering and non-linear optimization
  Vinzent Boerner
- Using Genomic Relationship Likelihoods to perform trio parentage assignment
  Kim Erik Grashei
- Obtaining variance of gametic diversity with genomic models
  Daniel Jordan De Abreu Santos
- Using Random Forests as a prescreening tool for genomic prediction: impact of subsets of SNPs on prediction accuracy of total genetic values
  Yutao Li
- Genomic selection in mink yield higher accuracies with a Bayesian approach allowing for heterogeneous variance than a GBLUP model.
  Trine Villumsen
- Combining heterogeneous across-country data for prediction of enteric methane from proxies in dairy cattle
  Enyew Negussie

Proceedings of the World Congress on Genetics Applied to Livestock Production: 2018

Volume Aquaculture , 2018
Volume Biology & Species - Bovine (dairy) 1 , 2018
Volume Biology & Species - Bovine (dairy) 2 , 2018
Volume Biology - Behaviour , 2018
Volume Biology - Disease Resistance 1 , 2018
Volume Biology - Disease Resistance 2 , 2018
Volume Biology - Disease Resistance 3 , 2018

Volume Biology - Feed Intake and Efficiency 1 , 2018
Volume Biology - Feed Intake and Efficiency 2 , 2018
Volume Biology - Growth and Development , 2018
Volume Biology - Reproduction 1 , 2018
Volume Biology - Reproduction 2 , 2018
Volume Challenges - Environmental , 2018
Volume Challenges - Genotype by Environment Interactions , 2018
Volume Challenges - Species Conservation , 2018
Volume Electronic Poster Session - Biology & Species - Bovine (dairy) 1 , 2018
Volume Electronic Poster Session - Biology & Species - Bovine (dairy) 2 , 2018
Volume Electronic Poster Session - Biology - Behaviour , 2018
Volume Electronic Poster Session - Biology - Disease Resistance 1 , 2018
Volume Electronic Poster Session - Biology - Disease Resistance 2 , 2018
Volume Electronic Poster Session - Biology - Disease Resistance 3 , 2018
Volume Electronic Poster Session - Biology - Feed Intake and Efficiency 1 , 2018
Volume Electronic Poster Session - Biology - Feed Intake and Efficiency 2 , 2018
Volume Electronic Poster Session - Biology - Growth and Development , 2018
Volume Electronic Poster Session - Biology - Reproduction 1 , 2018
Volume Electronic Poster Session - Biology - Reproduction 2 , 2018
Volume Electronic Poster Session - Challenges - Environmental , 2018
Volume Electronic Poster Session - Challenges - Genotype by Environment Interactions , 2018
Volume Electronic Poster Session - Challenges - Species Conservation , 2018
Volume Electronic Poster Session - Genetic gain - Breeding Objectives and Economics of Selection Schemes 1 , 2018
Volume Electronic Poster Session - Genetic gain - Breeding Objectives and Economics of Selection Schemes 2 , 2018
Volume Electronic Poster Session - Genetic Gain - Breeding Strategies 1 , 2018
Volume Electronic Poster Session - Genetic Gain - Breeding Strategies 2 , 2018
Volume Electronic Poster Session - Genetic Gain - Genotyping & Phenotyping Strategies , 2018
Volume Electronic Poster Session - Genetic Gain - In Challenging Environments , 2018
Volume Electronic Poster Session - Genetic Gain - Strategies for Local Breeds 1 , 2018
Volume Electronic Poster Session - Genetic Gain - Strategies for Local Breeds 2 , 2018
Volume Electronic Poster Session - Knowledge - Education and Training , 2018
Volume Electronic Poster Session - Method and Tools - Prediction 1 , 2018
Volume Electronic Poster Session - Methods and Tools - GWAS , 2018
Volume Electronic Poster Session - Methods and Tools - Imputation , 2018
Volume Electronic Poster Session - Methods and Tools - Models and Computing Strategies 1 , 2018
Volume Electronic Poster Session - Methods and Tools - Models and Computing Strategies 2 , 2018
Volume Electronic Poster Session - Methods and Tools - Prediction 2 , 2018
Volume Electronic Poster Session - Methods and Tools - Prediction 3 , 2018
Volume Electronic Poster Session - Methods and Tools - Software , 2018

Volume Electronic Poster Session - Molecular Genetics 1 , 2018
Volume Electronic Poster Session - Molecular Genetics 2 , 2018
Volume Electronic Poster Session - Molecular Genetics 3 , 2018
Volume Electronic Poster Session - Molecular Genetics 4 , 2018
Volume Electronic Poster Session - Species - Aquaculture 1 , 2018
Volume Electronic Poster Session - Species - Aquaculture 2 , 2018
Volume Electronic Poster Session - Species - Avian 1 , 2018
Volume Electronic Poster Session - Species - Avian 2 , 2018
Volume Electronic Poster Session - Species - Bovine (beef) 1 , 2018
Volume Electronic Poster Session - Species - Bovine (beef) 2 , 2018
Volume Electronic Poster Session - Species - Caprine , 2018
Volume Electronic Poster Session - Species - Equine , 2018
Volume Electronic Poster Session - Species - Other , 2018
Volume Electronic Poster Session - Species - Ovine , 2018
Volume Electronic Poster Session - Species - Porcine 1 , 2018
Volume Electronic Poster Session - Species - Porcine 2 , 2018
Volume Electronic Poster Session - Technologies - Genotyping , 2018
Volume Electronic Poster Session - Technologies - Novel Phenotypes , 2018
Volume Electronic Poster Session - Theory to Application - 1 , 2018
Volume Electronic Poster Session - Theory to Application 2 , 2018
Volume Electronic Poster Session - Theory to Application 3 , 2018
Volume Genetic gain - Breeding Objectives and Economics of Selection Schemes 1 , 2018
Volume Genetic gain - Breeding Objectives and Economics of Selection Schemes 2 , 2018
Volume Genetic Gain - Breeding Strategies 1 , 2018
Volume Genetic Gain - Breeding Strategies 2 , 2018
Volume Genetic Gain - Genotyping & Phenotyping Strategies , 2018
Volume Genetic gain - In Challenging Environments , 2018
Volume Genetic gain - Strategies for Local Breeds 1 , 2018
Volume Genetic Gain - Strategies for Local Breeds 2 , 2018
Volume Knowledge - Education and Training , 2018
Volume Method and Tools - Models and Computing Strategies 1 , 2018
Volume Method and Tools - Prediction 1 , 2018
Volume Methods and Tools - GWAS , 2018
Volume Methods and Tools - Imputation , 2018
Volume Methods and Tools - Models and Computing Strategies 2 , 2018
Volume Methods and Tools - Prediction 2 , 2018
Volume Methods and Tools - Prediction 3 , 2018
Volume Methods and Tools - Software , 2018
Volume Molecular Genetics 1 , 2018
Volume Molecular Genetics 2 , 2018
Volume Molecular Genetics 3 , 2018
Volume Molecular Genetics 4 , 2018
Volume Plenary - Thursday , 2018
Volume Species - Aquaculture 1 , 2018
Volume Species - Aquaculture 2 , 2018
Volume Species - Avian 1 , 2018

Volume Species - Avian 2 , 2018
Volume Species - Bovine (beef) 1 , 2018
Volume Species - Bovine (beef) 2 , 2018
Volume Species - Caprine , 2018
Volume Species - Equine , 2018
Volume Species - Other , 2018
Volume Species - Ovine , 2018
Volume Species - Porcine 1 , 2018
Volume Species - Porcine 2 , 2018
Volume Te Puke Plant and Food Research , 2018
Volume Technologies - Gene Editing , 2018
Volume Technologies - Genotyping , 2018
Volume Technologies - Novel Phenotypes , 2018
Volume Technologies: Milk testing inc. spectral analysis 2 , 2018
Volume Theory to Application 1 , 2018
Volume Theory to Application 2 , 2018
Volume Theory to Application 3 , 2018

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

MINUTES ICAR EXTRAORDINARY GENERAL ASSEMBLY

DATE 10TH FEBRUARY 2018 – AUCKLAND (NEW ZEALAND)
TIME 8H30 TO 9H00

1. Call to Order & Approval of Agenda

Under the chairmanship of the ICAR President, Jay Mattison, the Extraordinary General Assembly took place in Auckland (New Zealand) on Saturday 10th February 2018.

MOTION: It was duly moved, seconded and carried that the *quorum* was reached and the agenda approved as presented.

2. Approval of the new Statutes

The Vice-President Niels Henning Nielsen illustrated the ICAR Statutes which have been updated to reflect the Association's current structure.

MOTION: It was duly moved, seconded and carried that the Statutes are approved as presented.

3. Any other business

There was no other business.

4. Adjourn

The meeting was closed at 9h00.

MINUTES ICAR GENERAL ASSEMBLY

DATE 10TH FEBRUARY 2018 – AUCKLAND (NEW ZEALAND)
TIME 9H00 TO 10H15

1. Call to Order & Approval of Agenda

Under the chairmanship of the ICAR President, Jay Mattison, the General Assembly took place in Auckland (New Zealand) on Saturday 10th February 2018.

MOTION: It was duly moved, seconded and carried that the *quorum* was reached, and the agenda approved as presented.

2. Approval of the minutes

MOTION: It was duly moved, seconded and carried that the minutes of the General Assembly of 14th June 2017 were approved as presented.

MOTION: It was duly moved, seconded and carried that the minutes of the Extraordinary General Assembly of 14th June 2017 were approved as presented.

3. Financial reports

3.1 2017 Year End Financial Statements. Martin Burke, Chief Executive, presented the balance sheet and profit and loss accounts for 2017.

3.2 Inspector's report. Neil Petreny, ICAR inspector, reported to the General Assembly the auditing made by the Inspectors with fully satisfaction and the recommendation to approve the 2017 accounts.

MOTION: It was duly moved, seconded and carried that the balance sheet and profit and loss accounts 2017 were approved as presented.

3.3 2018 Budget. Martin Burke presented for information the budget for 2018.

4. Election new Board member

The President informed there were three Board members for re-election of their second mandate: Bianca Lind (Germany), Laurent Journaux (France), and Niels H. Nielsen (Denmark).

MOTION: It was duly moved, seconded and carried that Bianca Lind, Laurent Journaux and Niels H. Nielsen are renewed for their second mandate as proposed.

According with the new Statutes, there was a proposal to extend for two years the mandate of Jay Mattison (United States) and Kaivo Ilves (Estonia).

MOTION: It was duly moved, seconded and carried that Jay Mattison and Kaivo Ilves are extended for two years, until 2020, as proposed.

There are two vacancies. Hans Wilmink (The Netherlands) informed that he will step back from the ICAR Board due to his retirement. A second vacancy is an open position since three years. The President informed that two applications were received, one from Frido Hamoen (CRV, The Netherlands) and a second from Antonio Martins (ANABLE, Portugal).

MOTION: It was duly moved, seconded and carried that Frido Haomen and Antonio Martins are elected members of the Board for a first mandate as proposed.

5. Groups and Guidelines update

Brian Wickham, responsible for Groups' coordination, presented a detail of the changes, achievement and priorities in SCs and WGs since last General Assembly, and the update of the Guidelines.
A pamphlet was distributed containing the main achievements and the priorities of the Groups.
He also presented the state of the art and "quick wins" achieved in the new format of the Guidelines available on the Web site which makes easier to browse and access to specific interest.
The Members were informed about the changes to the Guidelines proposed by the Dairy Cattle Milk Recording WG, the Conformation Recording WG, the Identification Devices Sub Committee, and the Dairy Sheep and Goats WG. The new text was put up on the web site for Members' comments in advance.

6. Presentation of new Members

The President welcomed the following new full Members:

- ABRI-BreedPlan (Australia)
- Latvian Holstein Association (Latvia)

7. Presentation of Certificates of Quality

Charl Hunlun, responsible for this activity, informed that 2 Members applied for the Consultative Review due at midterm since June 2017:

- Växa (Sweden)
- Association Wallone d'Elevage (Belgium)

8. Awards

The President delivered the Distinguished Service Award to Hans Wilmink, Board member, Gavin Scott, chair of the Milk Analysis Sub Committee, and Gordon Doak (in absence), chair of the Artificial Insemination and Relevant Technologies Working Group.

The Distinguished Certificate Award was given to:

- Derrik Friggot, Breed Association WG
- Roger Trewella, Breed Association WG
- Zdravko Barac, Sheep, Goat & Small Camelid WG
- Jay Mattison, Identification SC
- Alfred de Vries, AI & RT WG
- Jan-Ake Erikson, AI & RT WG
- Ulrich Janowitz, AI & RT WG
- Marj Faust, Interbull SC
- Pascal Savary, Recording and Sampling Devices SC
- Snorri Sigurdsson, Recording and Sampling Devices SC
- Karl Zottl, CoQ Expert Advisory Group

9. President's report

The President made a short presentation on:

- ICAR administrative and internal operations
- ICAR technical structure
- GenoEx PSE Service in Interbull
- ICAR SLU-Interbull Agreement
- Sensor TF – next phase
- Current and future engagement

and the connections and collaborations with IDF, GDP, OIE, SLU, ADSA, Govt, and Beef.

A special thanks to all the groups and members, as well as to their associations, for the continuous work and commitment with ICAR.

He underlined the ICAR profile and outreach as a neutral platform, then invited all the ICAR community to celebrate the past but work in the present and prepare for the future!

Statement on ICAR-EAAP-Andrea Rosati Legal Proceedings

The President informed that ICAR is involved in a legal proceeding filed by Andrea Rosati against ICAR and EAAP in the courts of Terni, Italy.

Rosati was employed by EAAP and EAAP provided services and office space to ICAR from 2002 to 2014.
The EAAP relationship with ICAR was terminated after failing to reach an agreement between the parties by a letter from EAAP to ICAR in 2014.
Despite this termination by EAAP to ICAR, Andrea Rosati has taken legal action against ICAR and EAAP.
This legal proceeding is currently in the Italian courts as previously stated.

10. ICAR update / Forum for members

Martin Burke gave an update on the ICAR core's products and services to Members.

- ID Testing/Certification/Validation
- Recording & Sampling Devices Testing/Certification
- Milk Analysis Laboratory Proficiency Testing (PT)
- Milk Analysis Equipment Certification – **NEW**!
- Genetic Analysis Laboratory Accreditation
- DNA Data Information Centre Accreditation – **NEW**!
- GenoEx-PSE – **NEW** !
- Interbull / Interbeef Genetic Evaluations
- Certificate of Quality

In 2018 the ICAR team will focus on:

- ICAR Guidelines Project Phase II
- New Services 'bed in';
- ID Field Test, Milk Analysis Equip Cert, DNA Data Centre Accreditation, GenoEX-PSE
- Groups/Task Forces Doc Platform Support
- Proactive Engagement - Members/Partners
- IT Upgrade/GDPR

11. Invitation to the 2019 and 2020 General Assemblies

Pavel Buçek, member of the organizing committee 2019, made a presentation of the 2019 ICAR Conference to be held in Prague (Czech Republic) from 17th to 21th June 2019. This meeting will be in conjunction with the IDF.

Hans Wilmink member of the organizing committee 2020, made a presentation of the 2020 ICAR Conference to be held in Leeuwarden (The Netherlands) in from 8th to 12th June 2020.

The President invited since now the ICAR community to attend the next ICAR Conferences.

12. Any other business

There was no other business.

13. Adjourn

The meeting was closed at 10h15.