出國報告（出國類別：其他）

赴澳大利亞參加「2010 全球生物安全會議」出國報告

服務機關：行政院農業委員會農業試驗所
姓名職稱：蘇俊峯助理研究員
派赴國家：澳洲布理斯班
出國期間：20100228-0307
報告日期：20100528

提 要 表

系統識別號：	C09901500
計畫名稱：	國際合作
報告名稱：	赴澳大利亞參加「2010 全球生物安全會議」出國報告
計畫主辦機關：	行政院農業委員會農業試驗所
出國人員：	姓名：蘇俊峰 服務機關：行政院農業委員會農業試驗所 服務單位：植物病理組 職稱：助理研究員 官職等：薦任(派) E-MAIL 信箱：聯絡人 mslin@tari.gov.tw
出國地區：	澳大利亞
參訪機關：	現代藝術美術館（Gallery of Modern Art, GoMA），布里斯本市立植物園，黃金海岸
出國類別：	其他
出國期間：	民國 99 年 02 月 28 日至民國 99 年 03 月 07 日
報告日期：	民國 99 年 05 月 28 日
關鍵詞：	2010 全球生物安全會議，Global Biosecurity 2010，澳大利亞，布里斯班，洋香瓜病毒病，瓜類細菌性果斑病，洋香瓜黑點根腐病
報告書頁數：	30 頁
報告內容摘要：	「2010 全球生物安全會議」於 2010 年 2 月 28 日至 3 月 3 日，由 Horticulture Australia Linited（HAL）、Grains Research & Development Corporation （GRDC）與 Australian Centre of Excellence for Risk Analysis （ACERA）主辦，在澳洲布里斯班國際會議暨貿易中心舉辦。面對全球化經貿與觀光旅遊的衝擊，在生物安全（Biosecurity）上新的挑戰接踵而來。制式化的生物安全系統之下，要達到零風險（zero-risk）是不可能的任務。因此，提升與加強生物安全系統，使其能更加機警（smarter）的運作，才能更有效率的保護國內的農業與生態環境，其中國內、外研究部門與行政體系之間的合作關係是不可或缺的要素之一。此外，全球各地皆有報導指出入侵性動物（invasive animals）會造成本地原生物種族群生物多樣性（native biodiversity）的消失與衰退，過去一般認爲人爲因素的引進，是入侵性動物進入某一國家或地區的主要原因。但是有些例子顯示自然生態系中，生物族群本身對於某一國家或區域的移入與移出，也是入侵性動物的可能來源途徑之一。總結，隨著全球化，旅客、貨物運輸的網路四通八達，目前有害生物的入侵主要可區分爲三個機制，包括（1）商業行爲的進出口，（2）媒介的傳播，包含旅客出入境，與（3）相鄰區域的自然傳播。其中商業行爲的進、出口仍在可以管理、監測與控制的範疇之內，對於媒介的傳播，特別是非法的走私、旅客的污染與感染，還有相鄰區域的自然傳播等，都在考驗對於有害生物入侵監測系統的立法與執法。本次會議農業試驗所由筆者代表出席，發表一篇專題報告，題目爲「invasive diseases of cucurbits in Taiwan」，主要報導台灣近年來新發生的洋香瓜病毒病、瓜類細菌性果斑病與洋香瓜黑點根腐病的發生與防治。
電子全文檔：	C09901500_01.pdf

附件檔：	
限閱與否：	否
專責人員姓名：	林美伸
專責人員電話：	04-23302301 分機 7202

赴澳大利亞參加「2010 全球生物安全會議」出國報告

摘要：

「2010 全球生物安全會議」於 2010 年 2 月 28 日至 3 月 3 日，由 Horticulture Australia Linited （HAL）、Grains Research & Development Corporation （GRDC）與 Australian Centre of Excellence for Risk Analysis （ACERA）主辦，在澳洲布里斯班國際會議暨貿易中心舉辦。面對全球化經貿與觀光旅遊的衝擊，在生物安全（Biosecurity）上新的挑戰接踵而來。制式化的生物安全系統之下，要達到零風險（zero-risk）是不可能的任務。因此，提升與加強生物安全系統，使其能更加機警（smarter）的運作，才能更有效率的保護國內的農業與生態環境，其中國內、外研究部門與行政體系之間的合作關係是不可或缺的要素之一。此外，全球各地皆有報導指出入侵性動物（invasive animals）會造成本地原生物種族群生物多樣性（native biodiversity）的消失與衰退，過去一般認爲人爲因素的引進，是入侵性動物進入某一國家或地區的主要原因。但是有些例子顯示自然生態系中，生物族群本身對於某一國家或區域的移入與移出，也是入侵性動物的可能來源途徑之一。總結，隨著全球化，旅客、貨物運輸的網路四通八達，目前有害生物的入侵主要可區分爲三個機制，包括（1）商業行爲的進出口，（2）媒介的傳播，包含旅客出入境，與（3）相鄰區域的自然傳播。其中商業行爲的進、出口仍在可以管理、監測與控制的範疇之內，對於媒介的傳播，特別是非法的走私、旅客的污染與感染，還有相鄰區域的自然傳播等，都在考驗對於有害生物入侵監測系統的立法與執法。本次會議農業試驗所由筆者代表出席，發表一篇專題報告，題目爲「invasive diseases of cucurbits in Taiwan」，主要報導台灣近年來新發生之洋香瓜病毒病、瓜類細菌性果斑病與洋香瓜黑點根腐病的發生與防治。

關鍵字：

2010 全球生物安全會議、Global Biosecurity 2010、澳大利亞、布里斯班、洋香瓜病毒病、瓜類細菌性果斑病、洋香瓜黑點根腐病

目次：

壹、目的：

由於國際間的交流日益頻繁，不論在農產品貿易或觀光旅遊，生物安全已成爲國與國政府之間，進、出口業者或是環境保護團體、組織相當重視的課題。生物安全的課題牽涉範圍廣泛，如人類環境衛生與傳染性疾病、農產品疫病蟲害或畜牧養的傳染性疾病，甚至包括人畜共同傳染疾病等。不管哪一方面，一旦有疫情傳出，每每都會對單一國家或是地區造成嚴重的衝擊。有鑑於此，主辦單位（Horticulture Australia Linited、Grains Research & Development Corporation 與 Australian Centre of Excellence for Risk Analysis）希望藉由「2010 全球生物安全會議」的舉辦，邀請國際間生物安全議題有興趣的專家學者與會，包括 Rebecca Bech (the deputyAdministrator for Animal and Plant Health Inspection Services's Plant Protection and Quarantine program)、Angus Cameron (director of AusVet Animal Health Services)、Mick Clout (vertebrate ecologist, centre for Biodiversity & Biosecurity, University of Auckland)、Rob Delane (Director General for the Department of Agriculture and Food)、Robert L Griffin (the Director of the Plant Epidemiology and Risk Analysis Laboratory within the Center for Plant Health Science and Technology with USDA-APHIS) 與 Johann van der Merwe (Director for South African National Parks)等，對於相關議題提出建言與討論。同時開放給世界各地對生物安全議題有興趣的專家學者與會，並可提出相關議題的專題報告。藉由本次會議內容相關知識的傳遞，並分享預防與緊急處理措施，期望各國將來在處理有害入侵生物相關議題時能有所幫助。

貳、過程：

本次出國參加會議由 2 月 27 日至 3 月 7 日共計 9 天，其主要行程如下：

日期			地點	工作項目
月	日	星期		
2	27	六	台北→布里斯班	啓程。
2	28	日	國際會議暨貿易中心（Convention and Exhibition Centre）	參加會議「Global Biosecurity 2010: safeguarding agriculture and the environment」，相關議程如附件一。
3	1	一		
3	2	二		
3	3	三		
3	4	四	布里斯班	自費參觀下列地點： （1） 現代藝術美術館（Gallery of Modern Art, GoMA）。 （2） 布里斯本市立植物園。 （3） 黃金海岸。
3	5	五		
3	6	六		
3	7	日	布里斯班→台北	回程。

參、心得：

一、 對於布里斯班與際會議暨貿易中心的第一印象:「2010 全球生物安全會議」於 2010 年 2 月 28 日至 3 月 3 日，由 Horticulture Australia Linited （HAL）、Grains Research & Development Corporation （GRDC）與 Australian Centre of Excellence for Risk Analysis （ACERA）主辦，在澳洲布里斯班國際會議暨貿易中心舉辦。布里斯班是澳洲的第三大城，都市隨著布里斯班河自然區隔北岸爲商業區，南岸爲文化區。商業區內政府機關與商業大樓林立，文化區內有博物館、美術館、昆士蘭州立圖書館、現代藝術美術館與 1988 年舉辦世貿博覽會的國際會議暨貿易中心（Convention and Exhibition Centre）、劇院及舉辦大型露天活動的南岸公園（South Bank Parkland），本次會議「2010 全球生物安全會議（Global Biosecurity 2010: safeguarding agriculture and the environment）」即是在國際會議暨貿易中心舉行。布里斯班市區大樓林立（圖一），到處可見不同國籍的人們隨性在街道上穿梭，人們恣意的享受下午茶時間（圖二），給人一種自由、進步、文明與適合辦各種國際研討會與展覽的第一印象。踏進國際會議暨貿易中心，寬敞的空間與明亮的採光（圖三），加上可組裝移動式的硬體設備，使得該中心的空能性與利用性大大的提升。

二、 會議期間：本次會議由 2 月 28 日當天下午四時開始報到，晚上六時則有“Welcome reception sponsored by Australian Quarantine and Inspection Service (AQIS)”（圖四）。分析本次參加的成員，本次會議前報名者共 332 人，其中澳大利亞籍有 274 人，其他有來自全球 21 個國家的專家學者、政府人員與業者與會。然而會議開幕當天，現場約有 1000 人與會（圖五）。3 月 4 日晚上七時，則有“Conference dinner sponsored by Queensland University of Technology (QUT)”（圖六）。本次會議主要分爲三大部分，分別爲（1）6 場邀請演講；（2）126 場口頭報告與（3）35 篇海報展示，相關議程如附

件一。在口頭報告方面又區分爲四個議題，同一時段，在不同場地同時進行，包括（a）threats，有 42 篇專題報告，主要針對與生物安全風險評估與計畫執行有相關議題進行專題報告。（b）drivers，有 42 篇專題報告，主要針對生物安全的重要性提出專題報告。（c）knowledge，有 42 篇的專題報告，主要發表與生物安全有關的資訊或是經驗的分享。（d）systems，亦有 42 篇專題報告，主要與生物安全有關，在政策擬定與管理或操作流程等相關議題提出報告。筆者則在海報展示中發表一篇論文，題目爲「invasive diseases of cucurbits in Taiwan, Su, J. F., Deng, T. C., Hseu, S. H. Cheng, Y. H., and Liao, J. Y.」，主要報導台灣近年來新發生之洋香瓜病毒病、瓜類細菌性果斑病與洋香瓜黑點根腐病的發生與防治（附件二）。參加本次會議在於收集生物安全相關議題的資料，因此大部分時間都在聽演講，然而由於本次演講場次眾多，又有海報展示，因此只能以挑選式聽取部分演講場次的內容。下述爲部分演講的摘要與心得：

（1） Rob Delane（Department of Agriculture and Food, Western Australia）主講 Reshaping agricultural biosecurity for Australia，文中闡述面對全球化經貿與觀光旅遊的衝擊，在生物安全上新的挑戰接踵而來。制式化的生物安全系統之下，要達到零風險（zero-risk）是不可能的任務。因此，提升與加強生物安全系統，使其能更加機警（smarter）的運作，才能更有效率的保護澳洲的農業與生態環境，其中國內、外研究部門與行政體系之間的合作關係是不可或缺的要素之一。

（2） Rebecca Bech（APHIS - United States Department of Agriculture）主講 Trade, Travel, Technology and Turmoil - The Drivers of Plant Biosecurity in the USA，文中闡述根據過去 20 年的資料統計，越來越多人到美國旅行，同時越來越多美國人到世界其他地區旅行，因此旅客在國際間的活動增加了病原菌、病蟲害甚至是雜草的境外移入與境內移出的風險。因此，相關單位經由技術面著手，利用科學的方法與儀

器測量提出佐證，並制定許多相關規定，希望旅客在享受國際旅遊的同時，也能兼顧國際間的生物安全。

（3） Mick Clout （University of Auckland）主講 Biodiversity impacts of invasive animal species，文中闡述在全球各地皆有報導指出入侵性動物（invasive animals）會造成本地原生物種族群生物多樣性（native biodiversity）的消失與衰退，過去一般認爲人爲因素的引進，是入侵性動物進入某一國家或地區的主要原因。但是有些例子顯示自然生態系中，生物族群本身對於某一國家或區域的移入與移出，也是入侵性動物的可能來源途徑之一。

（4） Colin Wellings（University of Sydeny）主講 The stripe rust pathogen of cereal crops in Australia: managing exotic and endemic threats to crop losses，文中闡述條銹病菌（*Puccinia striiformis*）造成澳洲冬季穀類作物的嚴重經濟損失，據估計每年約有 3 億澳幣的經濟損失。同時也增加生產成本，其中化學藥劑的使用爲主要。據 2003-2008 年統計在本病害殺真菌的使用上，估計每年需耗費 4-9 千萬美元。然而本病害在 1979 年以前並未在澳洲發生，乃是由歐洲傳入後，該病原菌經適應（adaptation）澳洲的環境氣候，進而造成族群的演化（population evolution），並嚴重危害澳洲穀類的生產。

（5） Kylie Ireland （Murdoch University）報導 Australian plant susceptibility to *Phytophthora ramorum* and their role in driving a potential epiphytotic，文中闡述 *P. ramorum* 在美國與歐洲造成嚴重的 Sudden Oak Death，目前被澳洲政府歸類爲一級（category 1）的檢疫病害。爲了進一步瞭解其對澳洲生態與環境的威脅，作者在美國加州進行研究，研究 *P. ramorum* 對澳洲產 69 種植物的感病性，結果 77%的受測試品種對 *P. ramorum* 表現感病性，特別是在夏天且植株有傷口的情況下，更容易被感染。

（6） James Bennett（University of Western Australia）報導 Forecasting spread for rapid response，文中闡述對於有害入侵生物能進行快速反應的關鍵在於有效率的監測策略，而有效率的監測取決於能在環境中找到有害的入侵生物，並能預測它的傳播。

（7） Rob Reeves （Queensland University of Technology）報導 Decision making under uncertainty with application to biosecurity，文中闡述 import risk assessment methodologies (IRA) 主要用於監測動植物進口時疫病蟲害發生的風險評估，利用標準的程序與方法，監測並降低因動植物的進口，造成本國動植物發生因入侵疫病蟲害的潛在風險。然而當病害很輕微時，IRA 並沒有辦法即時做出風險評估。此時，即是需要執行簡單的決策方法，也就是說，對於疫病蟲害應建立許多的劇情模式，一旦發生劇情的情節，結果已經決定了。

（8） Tom Kompas （Australian National University）報導 The economics of biosecurity: import risk, border quarantine, local surveillance and eradication measures，文中闡述進口風險評估、海關，港口檢疫、區域監測系統與隔離銷毀措施是目前在杜絕有害生物入侵的四個主要步驟。雖然可有效降低本地農業、環境與生態遭受可能被有害入侵生物危害的風險，但是卻也造成了貿易障礙、檢防疫成本的增加。因此，作者建議在進行有害入侵生物風險評估之時，應該採用 bioeconomic models，進行 cost-benefit 分析。

（9） Johan van Der Merwe（Gorgon Quarantine Manager, Chevron Australia）主講 Biosecurity challenges for large multi-national resource projects，文中闡述天然資源的開發，如天然氣，會對環境與生態的生物多樣性造成嚴重的衝擊。

（10）Angus Cameron（AusVet Animal Health Services）主講 Animal health surveillance systems，文中闡述監控（surveillance）在生物安全上扮

演重要的角色，包括生物族群的消長，有害生物的入侵點與進展，甚至可提供作爲風險評估的重要依據。近來不論是在動物或植物有害生物上，皆有許多新發展的監控技術，這些技術應用於風險評估上，趨向於複雜，需要收集大量的原始資料，然後透過數學模式或統計分析，然後得到風險評估的結果。然而一套好的監控系統或技術，需要具備有簡單、方便與廉價等特質。

（11）Cindy Hauser （University of Melbourne）報導 Where and how much? Cost-effective surveillance for invasive species management，文中闡述監控（surveillance）是目前用於發現、管理有害生物入侵，非常重要的策略之一。然而對於一些族群密度非常低的有害生物之監控，在生物多樣性與經濟價值的評估上，是否符合經濟成本？作者提供監控技術的修正，包括增加適合的棲息地（habitat suitability）與傳播模式（dispersal modeling）等因子。

（12）Susan Barrett（Queensland University of Technology and Cooperative Research Centre）報導 Multiple species detection: statistical aspects of surveillance design，文中闡述當我們在設計監測系統時，對於低族群密度的有害生物監測或稀有有害族群的監測，亦或只是監控是否有有害生物存在時，應該可以依據有害生物的行爲模式，設計在同一監測系統中，同時監測多種有害生物。

（13）Denys Yemshanov （Natural Resources Canadian）報導 Early detection, information gaps and the design of surveillance programs for invasive species，文中闡述完整的有害生物的綜合風險地圖與有害生物風險分析（integrated risk maps and pest risk assessments），將可提供有害生物在監測時更加寬廣與更加完善的指導原則，然而對於新入侵有害生物相關知識的缺乏，是在監測有害入侵生物時最大的缺口。

（14）David Savage （University of Western Australia）報導 Landscape-scale

surveillance of fungal plant pathogens undergoing aerial dispersal，文中闡述對於空氣傳播的真菌性病害，一旦嚴重發生時會快速的大面積蔓延，甚至會演化出新的菌系。因此若能針對偵測空氣中病原真菌的孢子的數量，配合電腦模擬分析，將可以快速有效的進行區域內有害真菌的風險評估，並進行及時的反應策略。

（15）Simone Warner（Australian Animal Health Laboratory）報導 Full genome sequencing and its application in the identification of new biosecurity threats，文中闡述在監控有害入侵生物時，快速、有效、準確的鑑定與診斷，將有助於對於該有害生物的防治與管理。過去數十年，分子生物學快速發展，許多研究實驗室已開發出許多的分子檢測技術，並應用於有害入侵生物的監測系統中，特別是對於已知的病毒病害。然而，對於新發生或者尚未完全瞭解的病害，應用分子生物技術在監測上，似乎效果不是非常明顯，主要原因是缺乏專一性的基因序列。因此，作者利用解病毒全長序列的方式，應用於監測新發生的病毒病害。

（16）Linda Zhena（Biosecurity Queensland）報導 Diagnostic tools to support quarantine pathology laboratories，文中闡述植物病毒病害可在全球造成許多作物的危害，甚至可威脅世界各國的有害入侵生物監測系統。因此作者正利用傳統的 PCR 技術，搭配一組或多組對多種病毒的 group-specific primers 進行研究，期望該技術能利用於多種病毒的檢疫上。

（17）Philip Hulme（Bio-Protection Research Centre）報導 Are we on the right track to manage invasion pathways? 文中闡述隨著全球化，旅客、貨物運輸的網路四通八達，作者將目前有害生物入侵區分爲三個主要機制，包括（1）商業行爲的進出口，（2）媒介的傳播，包含旅客出入境，與（3）相鄰區域的自然傳播。這三個機制有可區分爲六

個途徑，包括（1）releases，（2）escape，（3）contaminant，（4）stowaway，（5）corridor 與（6）unaided。這些傳入的途徑，再再都在考驗立法與執法。

（18）Robert Griffin（APHIS- United States Department of Agricultyre）主講 Risk analysis to safeguard agriculture and natural biological systems，文中闡述風險評估（risk analysis）已被應用在許多方面，但是將風險評估以有系統性的應用在農業與環境健康相關議題上，則顯得較爲缺乏。

（19）Dominie Wright（Western Australia and Cooperative Research Centre）報導 Can we use CSI methods to detect fungal spores on clothing? 文中闡述旅客身上的衣服，是否會攜帶植物病原真菌的孢子，造成病害的傳播？作者目前針對銹病菌進行初步的實驗，由旅客身上收集銹病菌孢子。旅客衣服的纖維或針線的材質是收集孢子中最大的干擾因子。這些收集之後的孢子，將進行 mass spectrometry 與 real-time PCR 分析。

三、 自費行程。會議結束後，除了在布里斯班市區閒晃之外，亦參觀了（1）現代藝術美術館（Gallery of Modern Art, GoMA），（2）布里斯班市立植物園與（3）黃金海岸。讓我有機會以觀光客的身份體驗異地生活與感受異地風光，同時體驗單獨一人面對自己時，內心的沈靜與想法。不論您身處在世界上哪一個角落，每個人都有每個人所必須承受的生活壓力，當我們極力追求研究上的突破，亦或努力遵守工作手則之餘，「留空、留白、留閒」會讓您對工作、研究或人生有不同的感受。

四、 整體心得與感想：會議期間有跟其他學者交流，他們最常問到的問題是：你們代表團有幾人出席本次會議？他們都很詫異聽到「只有我一人」這樣

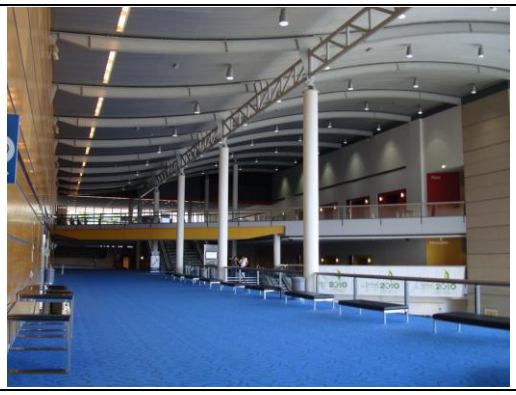
的答案。生物安全的領域非常廣泛，研究對象主要包含人體、家禽、家畜、野生動物、農產品的病蟲害、野生植物、雜草與生物多樣性等等，甚至包含國際貿易、動植物檢疫與防疫、旅客之出入境管理等等。後學的專長在於植物病害的生態與管理，對於其他領域或有涉略，卻略懂皮毛。聽取與會專家學者有關於生物安全的報告之後，有害生物的入侵對一個國家的經濟，農業與自然環境，甚至生態的生物多樣性皆會造成嚴重的衝擊。因此，在政策的擬定方面，對於境外移入的人與貨物，皆採用嚴格把關的策略，甚至一些對於可能在進口國內造成生物安全或有疑慮之時，可能會採取禁止進口的策略。在植物疫病蟲害的管理上，100%的防治效果是不可能的事，因此不論出口國或是進口國皆會有一些檢疫的處理措施，最常用的就是燻蒸。貨物一旦經過燻蒸，其商品價值都會被打了折扣。目前國內在動植物檢疫方面的研究，多從事如何證明我方（出口國）無對方（進口國）在檢疫上疫病蟲害，或是我方已經做了相關的檢疫處理等等的相關研究，卻甚少從事檢視對方（進口國）在檢疫上疫病蟲害規定的合理性。過去曾經在台灣參加過國內或國際性學術研討會，在會議的安排上，中餐通常是吃便當，每個人所吃的菜色就是便當所呈現的東西，而且通常是外燴。第一次出國參加學術性的國際會議，或許是風俗民情的不同，本次會議期間中餐都是以自助餐（buffet）的形式呈現，菜色呈現多樣化，雖然不是頂級的美味，但是有考慮到不同國籍的飲食習慣，而且可以增加與會學者之間的交流機會。最特別的是，做菜的廚房就在國際會議暨貿易中心內。

肆、建議

一、 本次會議議題廣泛，後學的專長在於植物病害的生態與管理，對於其他領域或有涉略卻略懂皮毛。因此建議，往後對於議題廣泛的會議，或可多派幾位不同領域專長的專家出席會議。

二、 世界各國在農產品貿易進口時，在動植物疫病蟲害的檢疫上會採取越來越嚴格的管理措施，但有些是不合理性的。因此，建議應當多多從事檢視對方（進口國）在檢疫上疫病蟲害規定的合理性之研究。

三、 未來，台灣有許許多多的機會需要辦國際研討會，如有不同飲食習慣的考量之餘，中餐或可以考慮以 buffet 的形式辦理，而且 buffet 的形式比較自由，可以增加與會學者之間的交流機會。

	
圖一、布里斯班市區大樓林立，到處可見不同國籍的人們隨性在街道上穿梭，給人一種文明與適合辦各種國際研討會與展覽的第一印象。	圖二、布里斯班市區的人們恣意的享受下午茶時間，給人一種自由與進步的第一印象。
	
圖三、本次會議是在國際會議暨貿易中心舉行，寬敞的空間與明亮的採光，讓人覺得很舒適。	圖四、澳洲檢疫處（Australian Quarantine and Inspection Service, AQIS）主辦歡迎酒會。
	
圖五、本次會議開幕當天，現場約有1000 人與會。	圖六、昆士蘭科技大學（Queensland University of Technology, QUT）主辦本次會議晚宴。

附件一

本次「2010 全球生物安全會議」議程

Sunday 28 February 2010				
4.00pm – 7.00pm	Registration Desk Open Exhibition open			
6.00pm – 7.30pm	Welcome Reception sponsored by Australian Quarantine and Inspection Service (AQIS)			
Monday 1 March 2010				
8.45am – 9.00am	Official Opening Megan Clark, Chief Executive, CSIRO Chair: Simon McKirdy			
9.00am – 9.45am	Plenary 1: *Reshaping agricultural biosecurity for Australia* Rob Delane, Department of Agriculture and Food, Western Australia			
9.45am – 10.30am	Plenary 2: *Trade, Travel, Technology and Turmoil - The Drivers of Plant Biosecurity in the USA* Rebecca Bech, APHIS - United States Department of Agriculture			
10.30am – 11.00am	Morning Tea			
Concurrent session 1	Threats	Drivers	Knowledge	Systems
11.00am – 11.15am	The stripe rust pathogen of cereal crops in Australia: managing exotic and endemic threats to crop losses Colin Wellings	Comprehensive bioeconomic modelling of the risk management of multiple non-indigenous harmful species: to exclude, or to wait and control?	The Australian Biosecurity Intelligence Network – a Commonwealth funded infrastructure initiative Joanne Banyer, Bronwyn	The Tasmanian biosecurity system – a case study in biosecurity policy, strategy, and action Andrew Bishop

		Roman Carrasco	Morrish and Steve McMahon	
11.15am – 11.30 am	Characterisation of Indonesian H5N1 isolates to understand the prolonged infection and spread of H5N1 among domestic poultry Hendra Wibawa	Rethinking biosecurity policy interventions: use of network analysis David Newth	Improving biosecurity outcomes through networking Australia's Wildlife Health data with the Australian Biosecurity Intelligence Network Karrie Rose	Biosecurity and public health: two sides of the same coin? Mel Taylor
11.30am – 11.45am	Factors affecting the introduction, distribution, migration and colonisation of currant-lettuce aphid *Nasonovia ribisnigri* (Mosley) in Australia Craig Feutrill	Using an ecological-economic model to quantify and communicate bio-invasion uncertainty in deliberative multi-criteria evaluation Shuang Liu	Building a virtual microscopy laboratory network through the Australian Biosecurity Intelligence Network Marc Kabay	Managing wildlife biosecurity in Australia Lee Skerratt
11.45am – 12.00pm	Foxes and on-farm biosecurity: have they a role in bovine Neospora abortion? Jessica King	Decision making under uncertainty with application to biosecurity Rob Reeves	Remote microscopy: diagnostics, training and beyond Michael Thompson	Managing biosecurity across borders: a comprehensive strategy Ian Falk
12.00pm – 12.15pm	Australian plant susceptibility to *Phytophthora ramorum* and their role in driving a potential epiphytotic Kylie Ireland	A participatory approach to prioritizing plant pests and diseases David Cook	A biosecurity framework for harmonisation of knowledge Debra Riddell	Driving science into biosecurity policy and operations Barney Stephenson
12.15pm – 12.30pm	Bats and the emerging zoonotic disease threat	If biological invasions are spatially and temporally explicit,	Office of the Chief Veterinary Officer's (OCVO) scanning	Regulation - a necessary evil Merryn Pugh

	Gary Crameri	why isn’ t biosecurity risk analysis? Brendan Murphy	report: an approach to identifying emerging issues for animal health management in Australia Belinda Wright	
12.30pm – 1.30pm	Lunch			
Concurrent session 2	Threats	Drivers	Knowledge	Systems
1.30pm – 1.45pm	Red imported fire ants: the benefits of applied genetics to the eradication program Jane Oakey	Incorporating uncertainty into import risk assessments: a Bayesian melding approach Petra Kuhnert	Office of the Chief Veterinary Officer’ s (OCVO) animal health scanning activities: so far so good, where to from here? Belinda Wright	International biosecurity research across the quarantine continuum Andy Sheppard
1.45pm – 2.00pm	Are we prepared for an exotic disease outbreak in feral pigs? Steven Lapidge	Policy and legal framework for managing biosecurity (Indonesian Perspective) Theofransus Litaay	Biosecurity cyberinfrastructure for surveillance, modelling and risk analysis Roger Magarey	Biosecurity planning and implementation Sharyn Taylor
2.00pm -2.15pm	Determining the natal origin of exotic pests using isotope and trace element geo – location markers Karen Armstrong	Australia’ s Government-Industry Partnership - a cornerstone of the biosecurity system Greg Fraser	Wildlife health information in Australia: bridging the gaps between wildlife and industry Rupert Woods	The National Goat Health statement, a tool to promote on-farm Biosecurity Lorna Citer
2.15pm – 2.30pm	Mobile mating disruption: using medflies against moths	The role of animal health laboratories in managing the risks	Building a global plant health alliance: the function and role of	Response management: one system to rule them all

	Bill Woods	from infectious diseases Martyn Jeggo	an integrated plant health information system Trevor Nicholls	Douglas Lush
2.30pm – 2.45pm	Benefit – cost analysis of the long-term containment strategy for exotic fruit flies in Torres Strait Mary Ann Franco-Dixon		Grains biosecurity aligns with dynamic communication and adoption industry programs for on-farm impact Judy Bellati and Lisa Sherriff	An overview of the Emergency Plant Pest Response Deed (EPPRD) Rod Turner
2.45pm – 3.00pm	Siam weed (*Chromolaena odorata*): the true cost - beyond agricultural impacts to quantifying environmental impacts Sarah Goswami	The economics of biosecurity: import risk, border quarantine, local surveillance and eradication measures Tom Kompas	Grain knowledge networks and risk management for phosphine resistance in stored grain insects Anna Carr	Subcommittee on plant health diagnostic standards Jane Moran
3.00pm – 3.30pm	Afternoon Tea			
3.30pm – 4.15pm	Plenary 3: *Biodiversity impacts of invasive animal species* Mick Clout, University of Auckland			
4.15pm – 6.00pm	Poster Display Session sponsored by Springer Science + Business Media B.V			
6.00pm	'Sponsors and Exhibitors only' Thank you Cocktail Event			
Tuesday 2 March 2010				
8.45am –	Housekeeping			

9.00am				
9.00am – 9.45am	Plenary 4: *Biosecurity issues for a large multi-national industry* Johan van Der Merwe, Chevron			
Concurrent session 3	Threats	Drivers	Knowledge	Systems
9.45am – 10.00am	Where and how much? Cost-effective surveillance for invasive species management Cindy Hauser	Principles of phytosanitary biosecurity surveillance Brendan Murphy	RabbitScan - engaging community knowledge Graeme Martin	Biosecurity surveillance problems are typically complex and require an integrated design approach: a solution Peter Whittle
10.00am – 10.15am	Multiple species detection: statistical aspects of surveillance design Susan Barrett	Are we on the right track to manage invasion pathways? Philip Hulme	Capacities needed to develop robust biosecurity organisations and policy Peter Black	Biosecurity surveillance design for invading species: Ecological aspects and expert elicitation Frith Jarrad
10.15am – 10.30am	Early detection, information gaps and the design of surveillance programs for invasive species Denys Yemshanov	The consequences of fire blight in Australian pome fruit industries David Cook	Biosecurity - the front line Tony Martin	PaDIL – innovation in delivering biosecurity to end users Ken Walker
10.30am – 11.00am	Morning Tea Launch of the National Plant Health Strategy sponsored by Plant Health Australia, with Dr Tony Gregson AM FTSE, Chairman of Plant Health Australia			
Concurrent session 4	Threats	Drivers	Knowledge	Systems
11.00am –	Landscape-scale surveillance of	An integrative approach to	New technologies for disease	Learning from experience:

11.15am	fungal plant pathogens undergoing aerial dispersal David Savage	understanding the pest and disease threats to agricultural biosecurity under future climates Jo Luck	surveillance Angus Cameron	improvements to biosecurity responses in New Zealand Douglas Lush
11.15am – 11.30am	Future-proofing surveillance: the challenges of emerging viruses and host switching Deborah Middleton	A modelling framework for understanding the impacts of climate change on biosecurity incursions of cropping systems Hazel Parry	Point of truth calibration: putting science into scoring systems Simon Barry	Equine influenza eradication – lessons for future responses Ron Glanville
11.30am – 11.45am	Mission Path Planning (MPP) for an Unmanned Aerial System (UAS) fitted with an air sampling device Felipe Gonzalez	Effects of expansion in human activity and climate change on plant virus introductions and emergence Roger Jones	Harnessing expert knowledge for biosecurity Samantha Low-Choy	Biosecurity practices of Australian horse owners one year after the 2007 outbreak of equine influenza Kathrin Schemann
11.45am – 12.00pm	Modelling the proximal source of intercepted exotic insects Darren Kriticos	Impact of climate change on food security and biosecurity in small Pacific nations Angela Freeman and Pita Taufatofua	Evidence for absence from absence of evidence – quantifying the value of general surveillance Tony Martin	A smutty story - lessons from an incursion of sugarcane smut Barry Croft
12.00pm – 12.15pm	Contribution of general surveillance to demonstrating area freedom for grain pests Nichole Hammond	Assessing the risk of plant pathogens in the irrigation channels of the Ord River irrigation area Rebecca Zappia	How to deal with evidence uncertainty in biosecurity decision-making? Kim Lowell	Rabies on the move in Indonesia - lessons for Australia Helen Scott-Orr
12.15pm –	Toward practical, PCR-based	Monitoring market infection status	Preferences and priorities in risk	Risk factors for the

12.30pm	detection methods for the surveillance of marine pests from ports and waterways Martin Deveney	John Weaver	mitigation across multiple values Terry Walshe	spatial-temporaldistribution of Tabanus (Family: Tabanidae): a cart analysis Kirsty Moynihan
12.30pm – 1.30pm	Lunch			
Concurrent session 5	Threats	Drivers	Knowledge	Systems
1.30pm – 1.45pm	Full genome sequencing and its application in the identification of new biosecurity threats Simone Warner	Risk factors for the infection of horse premises by equine influenza in New South Wales Simon Firestone	Finding the hole in the dyke: how to stop the spread of pests using aquatic weeds in Australia as a case study Byron Pakula	How can research inform policy in weed incursion management? Dane Panetta
1.45pm – 2.00pm	Using next-generation sequencing methods for diagnostics development: examples from phosphine resistance David Schlipalius	Pig producers' perceptions of the human swine influenza A (H1N1) outbreak and its effect on their biosecurity practices Navneet Dhand	New methods of providing statistical confidence in zero detections for surveillance programs – a case study in the eradication of Yellow Crazy Ants Bernie Dominiak	A way to weigh dread weeds - a policy framework to estimate the costs and benefits of commercially valuable invasive species Stephen Johnson
2.00pm – 2.15pm	Development and validation of molecular diagnostic protocols to support quarantine and certification programs for Australian horticulture	Biosecurity perceptions of horse owners and managers in New South Wales and their attitudes towards a potential future outbreak of equine influenza	Enhancing New Zealand's animal identification and tracing systems: experiences developing a system for tracking and tracing cattle and deer	Australia's weeds of national significance program: achieving the biosecurity continuum Hillary Cherry

	industries Fiona Constable	Kathrin Schemann	Christopher Houston	
2.15pm- 2.30pm	Acaricide resistance in cattle ticks – current status, future trends and new technologies Louise Jackson	Public perceptions and conceptions of the human swine influenza A (H1N1) outbreak Navneet Dhand	Surveillance and capacity building for exotic plant pathogens in the Australian Cotton Industry Chris Anderson	Improving the integrity of exotic plant pest surveillance data with hand-held (PDA) Robert Emery
2.30pm – 2.45pm	Diagnostic tools to support quarantine pathology laboratories Linda Zheng	Village-level biosecurity for large ruminant transboundary disease risk management in northern Laos Peter Windsor	"Talking toads": community perceptions of the threat, impact and management of cane toads in northern Australia Anna Carr	Prospects for developing a mass-rearing facility for fruit fly parasitoids in Australia: an international viewpoint Mark Stevens
2.45pm – 3.00pm	Enhanced surveillance strategies for grapevine phylloxera Kevin Powell	Opportunity lost? Impacts of and responses to biosecurity breaches due to aquatic animal pathogens and their introduced hosts in Australia Richard Whittington	Biosecurity and taxonomic expertise Penelope Greenslade	Survival limits for Mediterranean fruit fly Francis De Lima
3.00pm – 3.30pm	Afternoon Tea			
3.30pm - 4.15pm	Plenary 5: *Animal disease surveillance systems* Angus Cameron, AusVet Animal Health Services			
4.15pm – 6.00pm	Poster Display Session sponsored by Springer Science + Business Media B.V			

7.00pm for 7.30pm	Conference Dinner sponsored by Queensland University of Technology (QUT)			
Wednesday 3 March 2010				
8.45am – 9.00am	Housekeeping			
9.00am – 9.45am	Plenary 6: *Risk analysis to safeguard agriculture and natural biological systems* Robert Griffin, APHIS- United States Department of Agriculture			
Concurrent session 6	Threats	Drivers	Knowledge	Systems
9.45am – 10.00am	Forecasting spread for rapid response James Bennett	Hendra virus – disease ecology and emergence Hume Field	Biosecurity: wicked problems, wicked solutions Byron Pakula	Multidisciplinary design and flight testing of a remote sensing airborne biosensor Felipe Gonzalez
10.00am – 10.15am	Risky business: synthesising expert judgements for environmental risk assessments Petra Kuhnert	Grains post entry quarantine – threats, pathways and prevention Brendan Rodoni	Modelling the establishment and spread of Emergency Plant Pests (EPPs) in Australia: simulate or suffer Juan Jose Garcia Adeva	Trends in biosecurity risk assessment Mark Burgman
10.15am – 10.30am	Atypical BSE and atypical scrapie: a review of risks to human health, animal health and trade Reg Butler	Developing an ecological basis for managing the threat posed by phosphine resistant stored grain beetles in Australia Andrew Ridley	Biosecurity and control of aquatic bioinvasion in Brazil: Golden mussel case Flavio Fernandes	High-risk environmental 'solutions' involving invasive species Tim Low

10.30am – 11.00am	Morning Tea			
Concurrent session 7	Threats	Drivers	Knowledge	Systems
11.00am – 11.15am	Species traits associated with environmental and economic impact of plant pests Therese Pluess	Gaps in vertebrate pest biosecurity that need plugging Tony Peacock	DNA barcoding, an emerging global standard for species identification, could revolutionise biosecurity diagnostics Andrew Mitchell	Modelling biosecurity risks: more complexity or back to basics? David Jordan
11.15am – 11.30am	Assessing the robustness of risk maps and survey networks to knowledge gaps about new invasive pests Denys Yemshanov	Pathogens in vertebrate pests in Australia Wendy Henderson	Next-gen molecular readout systems for biosecurity Bronwyn Battersby	Improving the quality of qualitative risk assessments Mark Burgman
11.30am – 11.45am	Assessing spatial patterns of disease risk to biodiversity: implications for the management of the amphibian pathogen, *Batrachochytrium dendrobatidis* Kris Murray	Grapevine Phylloxera: genotypic diversity and implications for management of incursions Kevin Powell	Development of nationally endorsed diagnostic protocols for plant pests Barbara Hall	Reconciling quantitative and qualitative approaches to import risk assessment Simon Barry
11.45am – 12.00pm	Can we build better spatial temporal models of pest insect incursions? A trial using	Building resilience into the sugarcane agroecosystem: preparing for Chilo	Guidelines for developing identification resources for plant protection and quarantine:	Biologically inspired computing provides add-ons for pest risk assessment in Biosecurity

	TOPS John Weiss	Saccharíphagus in South Africa Stuart Rutherford	accessibility, appropriateness, and circumscription Terrence Walters	Susan Worner
12.00pm – 12.15pm	Are scavenging ducks a biosecurity risk for HPAI spread and infection? Joanne Meers	Risk analysis for surra in Australia: some pieces of the puzzle Kirsty Moynihan	Categorisation of pests under the Emergency Plant Pest Response Deed (EPPRD) Sophie Peterson	Risk-return approach to biosecurity risk management: the role of the EpiCast model Don Gunasekera
12.15pm – 12.30pm	Risk analysis of virulent Newcastle disease associated with small landholders in Queensland, Australia Nina Kung	Emerging disease threats to protected cropping vegetable and ornamentals Denis Persley	Australia’s EPP diagnostic database: the plant biosecurity toolbox Amy Carmichael	Pest risk prioritization using Deliberative Multi-Criteria Evaluation (DMCE): a case study Michael Hurley
12.30pm – 1.30pm	Lunch			
Concurrent session 8	Threats	Drivers	Knowledge	Systems
1.30pm – 1.45pm	Optimised sampling, processing and testing for enhanced detection and characterisation of Avian Influenza Virus from field samples Simone Warner	A proactive approach: risk assessment for the plant pathogen Xylella fastidiosa Anne Rathe	Strategies to Increase plant biosecurity capacity in Australia Kirsty Bayliss	Hierarchical Bayesian models: epidemiology and data for delimiting invasions Mark Stanaway
1.45pm – 2.00pm	Development of a bead-based assay for simultaneous	Preventing and managing incursions of class 1 weeds in	Training the next generation of plant biosecurity	Ecological simplification is bad for one(‘s) health: an Australian

	detection of equine respiratory viruses Ximena Tolosa	Queensland Michael Day	professionals – the North Carolina experience Robert Griffin	perspective Ro McFarlane
2.00pm – 2.15pm	Beyond ELISA: high throughput plant virus detection via multiplexed bead-based immunoassays Jill Meldrum	Relationships between H7 avian influenza isolates from the five poultry outbreaks (1976-1997) in Australia Dieter Bulach	Biosecurity education initiatives in the US Animal and Plant Health Inspection Service Jennifer Nicholson	Testing a self organising map in a virtual world of invasive species Dean Paini
2.15pm-2.30pm	Can we use CSI methods to detect fungal spores on clothing? Dominie Wright	Reducing the impact of eradication for exotic grapevine pathogens Mark Sosnowski	Investigating plant pests just got fun! - plant biosecurity in school classrooms Kirsty Bayliss	Comparative assessment of the biosecurity risks associated with small and large scale pig producers Jenny-Ann Toribio
2.30pm – 2.45pm	Hyperspectral imagery for plant pest recognition Pattaraporn Khuwuthyakorn	Tall wheat grass and other invasive salinity 'solutions' Carol Booth	Issues and design challenges in building a biosecure live bird market in Hanoi John Weaver	Developing a paradigm for integrated insect eradication in orchard, urban and peri-urban areas Bill Woods
2.45pm – 3.00pm	Systematics of the Macropsinae (Hemiptera: Cicadellidae) leafhoppers of Australia Linda Semeraro	Trapping strategies for Mediterranean fruit fly in Australia Francis De Lima	Knowledge – the biosecurity commodity – summing up Stephen Prowse	Community engagement in biosecurity – success in six horticultural case studies Heleen Kruger
3.00pm	Closing Ceremony Room: Mezzanine M4			

附件二

參加本次會議所張貼之海報。筆者代表農業試驗所出席本次會議，會中於海報展示中發表一篇論文，題目爲「invasive diseases of cucurbits in Taiwan」。主要報導台灣近年來新發生之洋香瓜病毒病、瓜類細菌性果斑病與洋香瓜黑點根腐病的發生與防治。

Invasive diseases of cucurbits in Taiwan

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Dr. Su worked on fungal diseases of cucurbits and orchids. His research interests are microbial ecology and disease management.

Cucurbitaceous plants are one of major sources of vegetables and fruits in Taiwan. However, the occurrence of diseases on those plants causes huge losses in yield each year. Recently, the virus diseases have caused serious damage in muskmelon production in Tainan. More than NT 250 million losses due to virus diseases caused by *Melon yellow spot virus* (MYSV) and *Watermelon silver mottle virus* (WSMoV) in 2006 and *Squash leaf curl Philippines virus* (SLCPHV) in 2008. The MYSV and WSMoV were transmitted by thrips, while SLCPHV was transmitted by whitefly. Effective control measures consist of vector elimination, vector population surveillance and collective disease management. Root rot/vine decline of muskmelon caused by *Monosporascus cannonballus* was first reported in 1995 in Taiwan. Sudden wilt of most infected plants occurs in the field 2 weeks before harvesting causing fruit immaturity and loss of market value. Field surveys showed that the hosts of *M. cannonballus* included muskmelon, Japanese cantaloupe, oriental pickling melon, cucumber, wax gourd and bottle gourd used as rootstock for watermelon in Taiwan. The disease is very serious on muskmelon around Taiwan. For the other 5 cucurbit plants the disease is limited to some locations or in greenhouses. Currently, there is no effective method for control of this disease. However, grafting appears to have control potential. Bacterial fruit blotch of watermelon caused by *Acidovorax avenae* subsp. *citrulli* was first reported in 1987 in Taiwan. The primary inoculum of this disease is from seeds. The symptoms of olive water soaking and chap on fruit surface greatly affect on market value of watermelon. Moreover, recent study showed the melon and bitter gourd were also hosts of this pathogen. The healthy seed production and strict quarantine can prevent the spreading of this pathogen.

Fig. A. The mosaic spots on leaves caused by MYSV. Fig. B. The chlorotic mottles on leaves caused by WSMoV. Fig. C. The rugose mosaic and leaf curling caused by SLCPHV. Fig. D. *Monosporasus cannonballus* caused sudden wilt 2 weeks before harvesting. Fig. E. The olive water soaking on fruit surface caused by *Acidovorax avenae* subsp. *citrulli*.