出國報告（出國類別：其他－參加會議）

參加澳大利亞主辦 2022 年第 13 屆檢疫管理者會議(QRM)視訊會議報告

服務機關：行政院農業委員會動植物防疫檢疫局
姓名職稱：植物檢疫組 陳晟鐘 簡任技正
植物檢疫組 路幼妍 技正
植物檢疫組 張郁靈 技士
派赴國家：臺灣，中華民國
出國期間：111 年 5 月 17 日至 5 月 26 日
報告日期：111 年 8 月 17 日

提要表

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<tr><td>報告日期：</td><td>民國 111 年 08 月 17 日</td></tr>
<tr><td>關鍵詞：</td><td>國際貨運生物安全合作協定(ICCBA)、檢疫管理者會議(QRM)、生物安全(Biosecurity)、新興技術(Emerging technology)、郵包及電子商務(Post and E-commerce)</td></tr>
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報告書頁數：	137 頁
報告內容摘要：	檢疫管理者會議(Quarantine Regulators Meeting, QRM)2008 年舉行第 1 屆會議，旨在加強各政府檢疫機關就檢疫議題之交流與合作，每年召開不同主題會議，原定 2020 年舉行第 12 屆 QRM 於 2021 年 5 月至 6 月改以視訊方式辦理。2022 年因新冠肺炎疫情仍未趨緩，擔任 ICCBA 及 QRM 秘書處之澳大利亞農業、水利及環境部(Department of Agriculture, Water and the Environment, DAWE)，於 2022 年 5 月 17 日、19 日、24 日及 26 日以視訊會議方式辦理第 13 屆 QRM 會議，並邀請曾參加 QRM 會議之國家及國際組織參加。本屆 QRM 主題為「在不確定的環境下應用先進科技於生物安全管理措施(Adapting biosecurity regulation using advancing technology in an uncertain environment)」，議程重點為學習過去成功作法及創新，展望未來以確保具備能力應對不斷變化的環境，總計超過 30 個國家及國際組織，165 位代表視訊參加，就各項應用於防疫及檢疫之新興技術進行交流，包括使用 2D 及 3D X 光機結合演算法自動偵測貨物、行李或郵包中之違規檢疫物、應用機器人(robot)進行貨櫃及車輛偵測、使用行動裝置應用程式鑑定褐翅蠊象、運用數據分析提升檢疫派員效率等。各國針對應用偵測犬(detector dogs)於防疫及檢疫上之經驗、強化郵包及電子商務檢疫措施及生物安全創新(biosecurity innovation)、二手商品檢疫處理與管理措施及檢疫處理方法學(Quarantine treatment methodology)等議題進行經驗分享及討論，我國亦分享建置檢疫偵測犬隊及強化郵包與電子商務檢疫措施之經驗。
限閱與否：	否
專責人員姓名：	陸怡芬
專責人員電話：	02-33432052

摘　要

檢疫管理者會議(Quarantine Regulators Meeting, QRM)2008 年舉行第 1 屆會議，旨在加強各政府檢疫機關就檢疫議題之交流與合作，每年召開不同主題會議，原定 2020 年舉行第 12 屆 QRM 於 2021 年 5 月至 6 月改以視訊方式辦理。2022 年因新冠肺炎疫情仍未趨緩，擔任 ICCBA 及 QRM 秘書處之澳大利亞農業、水利及環境部(Department of Agriculture, Water and the Environment, DAWE)，於 2022 年 5 月 17 日、19 日、24 日及 26 日以視訊會議方式辦理第 13 屆 QRM 會議，並邀請曾參加 QRM 會議之國家及國際組織參加。本屆 QRM 主題為「在不確定的環境下應用先進科技於生物安全管理措施(Adapting biosecurity regulation using advancing technology in an uncertain environment)」，議程重點為學習過去成功作法及創新，展望未來以確保具備能力應對不斷變化的環境，總計超過 30 個國家及國際組織，165 位代表視訊參加，就各項應用於防疫及檢疫之新興技術進行交流，包括使用 2D 及 3D X 光機結合演算法自動偵測貨物、行李或郵件中之違規檢疫物、應用機器人(robot)進行貨櫃及車輛偵測、使用行動裝置應用程式鑑定褐翅椿象、運用數據分析提升檢疫派員效率等。各國並對應用偵測犬(detector dogs)於防疫及檢疫上之經驗、強化郵包及電子商務檢疫措施及生物安全創新(biosecurity innovation)、二手商品檢疫處理及管理措施與檢疫處理方法學(Quarantine treatment methodology)等議題進行經驗分享及討論，我國亦分享建置檢疫偵測犬隊及強化郵包與電子商務檢疫措施之經驗。

目次

壹、前　言

檢疫管理者會議(Quarantine Regulators Meeting, QRM)於2008年舉行第1屆會議，旨在加強各政府檢疫機關就檢疫議題之交流與合作，每年召開不同主題會議，往年均與貨運生物安全合作協定(International Cargo Cooperative Biosecurity Arrangement，ICCBA)工作小組會議共同舉行。因應新冠肺炎疫情影響，原定2020年4月於越南胡志明市舉行之第17屆ICCBA工作小組會議被迫延期，原定2020年舉行之第12屆QRM於2021年5月至6月改以視訊方式辦理，成效良好。2022年由於新冠肺炎疫情仍未趨緩，擔任ICCBA及QRM秘書處之澳大利亞農業、水利及環境部(Department of Agriculture, Water and the Environment, DAWE)(2022年7月更名為澳大利亞農業、漁業及林業部，Department of Agriculture, Fisheries and Forestry, DAFF，以下簡稱澳大利亞農業部)，於2022年5月以視訊會議方式辦理第13屆QRM會議，並邀請曾參加QRM會議之國家及國際組織參加。

往年QRM會議聚焦於調和各國生物安全邊境檢疫處理措施、促進貿易及能力建構。本屆QRM主題為「在不確定的環境下應用先進科技於生物安全管理措施(Adapting biosecurity regulation using advancing technology in an uncertain environment)」，議程重點為學習過去成功作法及創新，展望未來以確保具備能力應對不斷變化的環境，會議由澳大利亞農業部主辦，分別於5月17日、19日、24日及26日舉行，總計超過30個國家及國際組織，165位代表視訊參加，就各項偵測有害生物新興技術(emerging technology)、偵測犬(detector dogs)於防疫及檢疫上之應用經驗、強化郵包及電子商務檢疫措施(strengthening phytosanitary measures for international mail articles and e-commerce)與生物安全創新(biosecurity innovation)等議題進行經驗分享及討論。ICCBA會議則持續延期，將視2022年及2023年疫情狀況，再另覓適當地點舉開實體會議。

貳、議程安排

第一天會議：2022 年 5 月 17 日/Day One: Tuesday 17 May 2022		
時間 Time (AEST)	**議程 Agenda item**	**主題/Topic**
11:30am-11:40am	*1.1*	開幕式/ **Opening and Welcome to Country**
11:40am – 12:00pm	*1.2*	貴賓致詞/ **Welcoming address** *Andrew Tongue PSM, Deputy Secretary, Biosecurity and Compliance, DAWE (Australia)*
12:00pm – 12:30pm	*1.3*	藏匿於貨櫃中有害生物(搭便車)管理新技術/ **New Technologies for Hitchhiker Pest Management** *Sarah Bruce, DAWE (Australia)*
12:30pm – 12:45pm	*1.4*	經驗分享-多明尼加共和國防治及撲滅非洲豬瘟/ **Experience in the management and eradication of an outbreak of African Swine Fever in the Dominican Republic** *Abelardo de Garcia Scanapieco, OIRSA*
12:45pm – 1:00pm	*1.5*	臺灣檢疫犬應用及管理/ **Use and Management of Quarantine Detector Dogs in Taiwan** *Cheng-Chung Chen, BAPHIQ (Taiwan)*
1:00pm-1: 30pm	*1.6*	強化郵包輸入途徑的生物安全優勢/ **Strengthening Biosecurity Excellence in the Mail Pathway** *Stu Rawnsley, MPI (New Zealand)*

第二天會議：2022年5月19日(本日會議由中美洲農牧組織主持)/ Day Two: Thursday 19 May 2022		
時間 Time (AEST)	**議程 Agenda item**	**主題/Topic**
10:00pm – 10:15pm	*2.1*	哥斯大黎加管理及撲滅非洲大蝸牛經驗分享/ **Experiences in the management and eradication of an outbreak of the Giant African Snail in Costa Rica** *Leonardo Martin Vasquez, OIRSA*

10:15pm – 10:30pm	*2.2*	訓練哥斯大黎加偵測犬隊偵測非洲大蝸牛氣味/ **Lessons learned from the training of canine units for Giant African Snail scent fixation** *Cesar Ulises Dangu, OIRSA*
10:30pm – 10:45pm	*2.3*	強化國際郵包及電子商務植物檢疫管理措施/ **Strengthening Phytosanitary Measures for International Mail Articles and E-Commerce** *Yu-Ling Jhana, BAPHIQ (Taiwan)*
10.45pm – 11.00pm	*2.4*	下屆主題討論/ **Discussion of theme for next QRM** *Nathan Reid, DAWE (Australia)*
11:00pm – 11:30pm	*2.5*	智利防範褐翅椿象自二手商品入侵檢疫措施 **Phytosanitary requirements for the entry of used products that may carry Brown Marmorated Stink Bug, BMSB** *Juan Pablo Villalobos, SAG (Chile)*
11:30pm – 12:00am	*2.6*	溴化甲烷方法學綜合回顧/ **Methyl Bromide Methodology review** *Steve Peios, DAWE (Australia)*

第三天會議：2022 年 5 月 24 日/ Day Three: Tuesday 24 May 2022		
時間 Time (AEST)	**議程 Agenda item**	**主題/Topic**
11:00am – 11:30am	*3.1*	生物安全入口網/ **Biosecurity Portal** *Kathy Belka, DAWE (Australia)*
11:30am – 12:00pm	*3.2*	澳大利亞農業部分析-當前能力與未來提升/ **DAWE profiling-Current capability and future uplift** *Jon Webber, DAWE (Australia)*
12:00pm – 12:30pm	*3.3*	檢疫處理方法學/ **Treatment Methodologies** *Sam Griffiths, DAWE (Australia)*
12:30pm – 1:00pm	*3.4*	斯里蘭卡鮮果蒸熱處理概論/ **Overview of vapour heat treatment for fresh fruits in Sri Lanka** *Dr W.A.R.T. Wickramaarachchi, NPQS (Sri Lanka)*

第四天會議：2022 年 5 月 26 日/ Day Four: Thursday 26 May 2022		
時間 Time (AEST)	**議程 Agenda item**	**主題/Topic**
10:00am – 10:30am	*4.1*	檢疫犬組隊之擴建/ **Overview of the Expansion of the Canine Brigade** *Dr Oscar Camacho, Agriculture and Livestock Service SAG, (Chile)*
10:30am – 11:00am	*4.2*	利用創新科技偵測有害生物風險/ **Using advances in technology for biosecurity risk detection** *Joel Willis, DAWE (Australia)*
11:00am – 11:30am	*4.3*	生物安全的創新/ **Biosecurity Innovation** *Melissa Hindle/Jessica May, DAWE (Australia)*
11:30am – 12:00pm	*4.4*	閉幕式 / **Meeting wrap-up, future direction, next QRM, theme finalisation, and close** *Nathan Reid, DAWE (Australia)*

參、2022年簥13屆QRM會議內容與說明

一、 第一天會議：2022 年 5 月 17 日

(一)開幕式及貴賓致詞(Opening and Welcoming address)：

今年主題為「在不確定的環境下應用先進科技於生物安全管理措施」(Adapting biosecurity regulation using advancing technology in an uncertain environment)，會議由澳大利亞農業部生物安全部門副秘書長 Andrew Tongue 先生開場致詞，說明近年來由於氣候變遷影響加劇，使地球及生產環境變得更加嚴峻，新冠肺炎封城也造成更多的壓力及挑戰；而各國可以利用先進科技來調整與改良現有的檢疫措施，並藉由互相學習合作以及經驗傳承與分享，協助處理各種疫病害蟲問題。

(二)藏匿於貨櫃中有害生物(搭便車)管理新技術 (New Technologies for Hitchhiker Pest Management)

此節由澳大利亞農業部 Sarah Bruce 女士介紹該國用於偵測藏匿於貨櫃中有害生物的科技先趨計畫，包含手持式高光譜相機系統 (Hand-held Hyperspectral Camera System)、生物安全自動化威脅偵測系統 (Biosecurity Automated Threat Detection System)、環境 DNA 與貨櫃即時抽樣檢驗技術(Environmental DNA and Point-of Care technology for container sampling)、辨識褐翅椿象(Brown Marmorated Stink Bug, BMSB)之手機應用程式(Phone App to detect BMSB)、環式紅外線檢測技術 (Ring IR)及使用四輪驅動機器人(4 WD robot)進行檢查等。研究各項新技術偵測藏匿於貨櫃之有害生物，例如小紅鰹節蟲(khapra beetle)、褐翅椿象、小火蟻(electric ant)及亞洲舞毒蛾 (Asian gypsy moth)等有害生物，部分技術可應用於其他場域或即時紀錄檢查結果。Sarah Bruce 女士表示，期望新科技的導入能提升檢疫工作效能、節省人力、強化邊境檢查。其他與會成員亦表示認同，藉由互相交流相關技術，未來不僅可用於貨櫃查驗，也能應用於旅客物品的入境檢查。各國對於先進科技之研發及應用均表示高度興趣(附件 1)。

(三)經驗分享-多明尼加共和國防治及撲滅非洲豬瘟(Experience in the management and eradication of an outbreak of African Swine Fever in the Dominican Republic)

此節由中美洲農牧保健組織(OIRSA)地方動物衛生局 Abelardo de Garcia Scanapieco 先生分享多明尼加共和國於 2021 年至 2022 年非洲豬瘟爆發後採取之撲滅措施。該國目前報告發生非洲豬瘟計 1,276 例，其中 267 例已完成撲滅，1,009 例正在進行撲滅。該國非洲豬瘟發生案例於發現後 48 小時內進行通報，中央部會及第一線人員即時提供技術支援協助診斷鑑定，並以流行病學監測平台嚴施控管。製作海報、摺頁、影片等宣導教材，提供農民非洲豬瘟相關知識與資訊。與其他國際組織 (如 OIE、FAO、USDA 等)進行協調談判與合作，輔導國內獸醫更新相關知識與培訓課程。成立國家團隊專責管理，將境內疫情侷限於發生地，防止向外傳播到其他地區。

此外，Abelardo de Garcia Scanapieco 先生也說明該國後續將控制與撲滅非洲豬瘟措施分為三部分，其一是檢疫層面，加強邊境檢疫及檢查，例如使用檢疫犬隊、X 光機、加強國際保安等方式。其二是生產者層面，建立豬隻追蹤系統並更新國內豬隻普查資訊，加強中央部門對豬隻及其產品的管制，並積極實施教育宣導與溝通。其三是獸醫層面，應緊急成立並培訓國家團隊，建立非洲豬瘟診斷實驗室，人道屠宰染病豬隻，並集中運輸處理(附件 2)。

(四)臺灣檢疫犬應用及管理 (Use and Management of Quarantine Detector Dogs in Taiwan)

此節由本局植物檢疫組陳晟鐘簡任技正(時任植物檢疫行政科科長)介紹我國檢疫犬隊的發展與成效。2002 年自美國農業部檢疫犬訓練中心攜回三隻檢疫犬，同年應用於桃園及高雄機場旅客行李檢查。2003 年計畫自行訓練檢疫犬組，而後發展迄今。目前已有 56 組檢疫犬組於我國各機場港站服務。其中，新竹分局共有 28 組檢疫犬組，負責桃園機場業務；

而在高雄分局金門檢疫站有 3 組檢疫犬組，負責中國大陸地區輸入郵包偵測。近年因 COVID-19 疫情影響，國際航班及旅客數量銳減，但郵包及快遞貨量不減反增，近 3 年檢疫犬組加強訓練及偵測。此外，檢疫犬組也參加各媒體活動進行檢疫宣導。目前積極與他國進行檢疫犬犬種的育種技術交流合作，以穩定我國檢疫犬的犬隻來源(附件 3)。

(五)強化郵包輸入途徑的生物安全優勢 (Strengthening Biosecurity Excellence in the Mail Pathway)

此節由紐西蘭初級農業部(Ministry for Primary Industries, MPI) Stu Rawnsley 先生介紹紐西蘭強化郵包輸入途徑的生物安全策略。有三項基本的改變，其一是基礎設施的改變，會中展示奧克蘭物流處理中心的設施外觀與內部流程圖。其二是科技技術的改變，使用 3D 掃描技術強化郵包檢疫。其三是資訊處理方式的改變，由於萬國郵政聯盟(UPU)批准 Electronic Advance Data (EAD)發送義務化制度，國際郵包電子訊息的傳遞更加透明，也更便於政府管理國際間移動的檢疫物，透過收集相關郵包申報資訊，建立威脅剖析資料庫(threat profile libraries)並以智慧化引擎(intelligence engines)分析，無風險郵包可先予通關，高風險郵包則進行檢查。Stu Rawnsley 先生表示，期許未來 10 年內能夠以全自動化的方式處理郵包輸入檢疫(附件 4)。各國針對此一議題熱烈討論，日本代表提出，郵包中種子偵測為未來挑戰，人工智慧搭配 X 光機是否可能成為偵測郵件中種子的有效工具；智利代表分享該國經驗，許多貨品標示為珠寶或玩具，實際內容物為種子；我國詢問紐西蘭是否考慮對違規輸入進行裁罰，斯里蘭卡代表則詢問有關電子商務對策。紐方未針對提問給予具體回應。

二、 第二天會議：2022 年 5 月 19 日(本日會議由中美洲農牧組織主持)

(一)哥斯大黎加管理及撲滅非洲大蝸牛經驗分享(Experiences in the management and eradication of an outbreak of the Giant African Snail in Costa Rica)：

此節由哥斯大黎加國家檢疫局 Leonardo Martin Vasquez 先生說明，哥國 2019 年首次於 Curubandé 地區偵測發現非洲大蝸牛入侵，由於非洲大蝸牛對野生動物、糧食生產、公共衛生及國際貿易造成嚴重危害，因此哥斯大黎加國家檢疫局採行多項撲滅防疫措施，如宣佈全國性緊急植物防疫措施、劃定緊急防治區並設置 2,000 個以上偵測點、分析非洲大蝸牛族群發生情形、成立偵測犬隊偵測非洲大蝸牛氣味、進行人工及化學防治、嚴格管制及清理車輛進出緊急防治區，並要求大眾通報由專家指導正確銷燬以避免非洲大蝸牛擴散，最後於 2022 年成功降低非洲大蝸牛的數量，將其侷限於哥國 Curubandé 地區(附件 5)。

(二)訓練哥斯大黎加偵測犬隊偵測非洲大蝸牛氣味(Lessons learned from the training of canine units for Giant African Snail scent fixation)：

此節由哥斯大黎加國家檢疫局 Cesar Ulises Dangu 先生說明，2016 年非洲大蝸牛首次於多明尼加共和國發現，後哥國於境內發現非洲大蝸牛，2021 年中美洲農牧組織委員會(OIRSA)宣布非洲大蝸牛之緊急措施，藉由和鄰近國家合作引進偵測犬隻並進行非洲大蝸牛偵測訓練。由於非洲大蝸牛可能帶有寄生性線蟲，具公共衛生風險，訓練時須避免領犬員及犬隻直接接觸蝸牛，以免感染寄生蟲，由操作人員全程穿著手套等防護裝備，取出蝸牛之唾腺或腺體等氣味標的，置於容器內供犬隻訓練用，並設計訓練課程，最後成功建立訓練模式。初期雖因熱帶溫差大(24-32℃)及相對濕度變化大(68-89%)之環境，部分犬隻適應較困難，但最終 17 組偵測犬組皆順利完成偵測非洲大蝸牛氣味訓練。另墨西哥目前亦有 79 組犬組完成訓練用於偵測非洲大蝸牛(附件 6)。

(三)強化國際郵包及電子商務植物檢疫管理措施(Strengthening Phytosanitary Measures for International Mail Articles and E-Commerce)

此節由本局植物檢疫組張郁靈技士介紹我國強化國際郵包及電子商務輸入植物檢疫物管理措施之成效。近年來我國屢於進口郵包發現蓄意藏

匿之檢疫物，且電子商務因疫情影響更加蓬勃發展，利用國際郵包寄送植物檢疫物之電子商務大增，貨品貿易形式明顯改變，有害生物藉此管道進入我國風險增加。為降低有害生物入侵風險，本局加強國際郵包輸入植物檢疫物管理，除事先取得許可之外，植物檢疫物原則不得以郵包方式輸入，亦製作文宣向民眾宣導此措施及相關輸入檢疫條件，並與財政部關務署合作加強查緝，大大降低國際郵包違規輸入植物檢疫物之數量。另以關鍵字搜尋我國六大電商平臺販售之植物及植物產品，將涉及可能違規輸入之植物及植物產品下架，並持續與平臺業者溝通強化相關檢疫物販售審查機制，成功阻絕違法業者銷售管道(附件 7)。

(四)下屆主題討論(Discussion of theme for next QRM)

此節由澳大利亞農漁林部 Nathan Reid 先生主持，請各與會國對下次 QRM 會議主題提出建議，俾於閉幕式時討論。

(五)智利防範褐翅椿象自二手商品入侵檢疫措施(Phytosanitary requirements for the entry of used products that may carry Brown Marmorated Stink Bug, BMSB)

此節由智利農牧局 Juan Pablo Villalobos 說明，智利因自鄰近國家如美國輸入之二手衣鞋、玩具及車輛等二手商品截獲褐翅椿象，將其列為檢疫有害生物，並採行緊急措施，訂定相關法規。為防範褐翅椿象藉二手商品入侵智利，上述商品在輸入前須由美國農業部動植物檢疫署(USDA/APHIS)及智利檢疫單位認可之公司或單位進行殺蟲處理，並由處理公司簽發處理證明文件，檢疫處理方式如施用殺蟲劑、以溴化甲烷、磷化氫(phosphine))及硫醯氟(sulfuryl fluoride 燻蒸，以及 50℃熱處理 20 分鐘等；處理後之貨品於輸入時由智利檢疫單位進行檢疫，不符規定者應進行檢疫處理或退運，所需處理費用需由輸入人負擔。在加強檢疫規定及措施後，近年已成功降低截獲褐翅椿象數量(附件 8)。紐西蘭代表提出紐國曾研究以甲酸乙酯及二氧化碳處理可成功殺滅褐翅椿象，且甲酸乙酯較溴化甲烷安全，可供智利考量採用。

(六)**溴化甲烷方法學綜合回顧(Methyl Bromide Methodology review)**

此節由澳大利亞農業部 Steve Peios 先生說明，溴化甲烷方法學(Methyl Bromide Methodology)修訂進度，包含檢疫處理及裝運前處理時執行貨品溴化甲烷燻蒸應有之基本條件、執行裝運前溴化甲烷燻蒸處理之單位應監控其處理效果、執行裝運前處理的政府及溴化甲烷處理業者等，以利溴化甲烷檢疫處理及貨物輸入前處理可達最大效益。近期透過以往獲得之回饋意見進行溴化甲烷方法學修訂，減少易生誤解之用詞並簡化說明文字，清楚描述不同處理情境適用之處理條件，增進可用性及移除假設性之內容，使現行溴化甲烷方法學版本更加明確、精簡、易懂。目前持續透過內部及外部溝通，與各界進行溴化甲烷方法學的諮詢，未來也將收集並審視各國回饋意見，及規劃會議討論特定關切內容，以完成最終修改(附件 9)。

三、 第三天會議：2022 年 5 月 24 日

(一)生物安全入口網(Biosecurity Portal)：

此節由澳大利亞農業部 Kathy Belka 女士介紹該國生物安全入口網(Biosecurity Portal)，生物安全入口網是澳大利亞「客戶與工作量管理計畫」(The Client and Workload Management(CWLM) project)其中一項成果，該入口網提供輸入人、報關業者、空運業者等相關人員線上即時、簡明、快速的臨場檢疫申報平台，相較於以往業者以電子郵件申請輸入案件臨場檢疫，業者可使用生物安全入口網隨時上傳待臨場檢疫案件之資料並即時掌握案件進度。排程管理系統(Scheduling and Workload Management System, SWMS)可依據業者上傳資料，分析並規劃派遣檢疫人員執行臨場檢疫之路線及檢疫時間，傳送至行動裝置應用程式(Field Service Mobile, FSM APP)，節省檢疫單位原本以人工處理業者電子郵件申請臨場檢疫之時間。目前已於新南威爾斯、昆士蘭、西澳、南澳、北領地及首都特區開始使用，維多利亞省亦將於 7 月 20 日開始使用，未來將持

續依使用者回饋意見強化系統功能(附件 10)。

(二)澳大利亞農業部分析-當前能力與未來提升(DAWE Profiling - Current capability and future uplift)

此節由澳大利亞農業部之分析及標定部門(Profiling and Target Section)主管 Jon Webber 先生介紹有關該部門工作，包含分析貨櫃、旅客及郵包等有害生物入侵途徑，實施驗證管制措施有效性之對照測試，支援策略標定以發覺並阻斷高風險威脅，及管理合格貨櫃驗證計畫。由於近年國際貿易量增加，供應鏈日趨複雜，該部門藉由導入資料及分析工具、發展網路基礎建設及建置系統以提升分析能力，利用機器深度學習(machine learning)，由過去累積資料訓練機器由影像辨識可能的高風險貨物，並與檢疫人員實際檢查結果對照，顯示機器學習演算法已可高度準確地辨識高風險貨物。另亦透過 EAD 資料接收，可分析郵件申報資料，以期於未來發展辨識高風險郵包的能力(附件 11)。

(三)檢疫處理方法學(Treatment Methodologies)

此節由澳大利亞農業部 Sam Griffiths 先生介紹澳大利亞發展檢疫處理方法學(Treatment Methodologies)經驗。有效檢疫處理是農產品國際貿易的支柱，檢疫處理如效果不彰，可能造成有害生物傳播風險、輸出國失去原有市場進入資格、使貿易受阻。建立檢疫處理方法學之目的為使檢疫處理更有效率、更安全，讓處理業者了解規範並確實執行，減少因檢疫處理造成不必要的損失，以環境友善方式進行處理，並持續尋求新檢疫處理技術之應用。影響檢疫處理效能的重要因子，在溴化甲烷處理方面為處理藥劑濃度、時間及溫度；熱處理部分為溫度及時間；藥劑處理方面為濃度、施藥方式及範圍；氣體調節部分則為濃度、時間、溫度及壓力。澳大利亞建立檢疫處理方法學之程序，首先為諮詢專家及相關產業利益相關者，草擬出高水準的規範(high level requirement)；其次是準備檢疫處理方法學草案，預告徵詢大眾提供意見；最後是實施、檢視與修正(附件 12)。

(四)斯里蘭卡鮮果蒸熱處理概論(Overview of vapour heat treatment for fresh fruits in Sri Lanka)

此節由斯里蘭卡國家植物檢疫局 Wickramaarachchi 博士說明目前斯里蘭卡辦理鮮果蒸熱處理情形。依據 Leblanc et al., 2019 指出，斯里蘭卡目前計有 39 種果實蠅報告發生，其中 12 種已在該國對芒果、腰果、酪梨、番石榴、木瓜、番荔枝、黃果茄、印度杏仁、葫蘆科及人心果等蔬果造成危害。

Wickramaarachchi 博士說明該國針對東方果實蠅(*Bactrocera dosalis*)、番石榴果實蠅(*Bactrocera correcta*)、南瓜實蠅(*Zeugodacus tau*)、瓜實蠅(*Zeugodacus cucurbitae*)等 4 種果實蠅，進行耐熱性試驗，其中東方果實蠅對熱耐受性最強，故以其為進行大量殺蟲試驗之標的，將其接種於芒果(TomEJC mango)，在濕度 55-95%、芒果中心溫度達 47℃，經過 8 分鐘，即能完全殺滅東方果實蠅 (附件 13)。

四、 第四天會議：2022 年 5 月 26 日

(一)檢疫犬組隊之擴建(Overview of the Expansion of the Canine Brigade)：

此節由智利農牧局(Agriculture and Livestock Service, SAG)Oscar Camacho Inostroza 先生，說明該國工作犬及檢疫犬隊自 2005 年開始建立過程，目前有檢疫犬 68 隻，領犬員(為 SAG 正式檢疫人員)95 人，採多人一犬形式，即同一犬隻不限領犬員；犬隻來源包含私人或非政府組非捐贈及購買，經評估適合犬隻進行 3 個月的訓練，學習嗅聞技巧及分辨 12 種基本氣味，以玩具及稱讚等獎勵方式加強犬隻學習。犬組工作時間為 30 至 60 分鐘後休息 5 至 15 分鐘。犬隻如表現下降、受傷或疾病，或超過 6 歲以上，即結束服役。SAG 以藏有標的物的三角錐，評量分析犬隻偵測效能及正確率等各項數據。檢疫犬隊成立以來於邊境查獲馬蹄、蛇皮、活動物、種子等各種走私物及蝸牛等有害生物，可迅速檢查旅客行李及各式車輛、績效卓著(附件 14)。我國與會人員提問有關如

何取得犬隻，及犬隻年齡與犬隻表現關係，主講者回應，其與相關組織協議(agreement)，可取得流浪犬進行評估，如犬隻特質符合要求，則進行後續訓練；效能評量中犬隻平均年齡為 4 歲，年齡愈大犬隻，其中一項評量指標雖有下降，但在其他評量指標統計上並不顯著，年齡較大的犬隻仍可能與維持與年輕犬隻時相同表現。

(二)利用創新科技偵測有害生物風險(Using advances in technology for biosecurity risk detection)

此節由澳大利亞農業部 Joel Willis 女士說明澳大利亞用於偵測生物安全風險的先進科技及測試，例如使用 3D-X 光機檢查旅客行李，與紐西蘭初級農業部合作建立 3D 演算法(Algorithm Development)，以自動偵測肉類、水果、蔬菜及水產品，未來將擴大開發偵測象牙、犀角、龜殼等產品之演算法，2021 年於來自中國大陸標示為衣物之包裹中發現藏匿多肉植物；相同演算法亦試驗於 2D-X 光機建立，目前尚在測試及收集影像建立資料庫。針對旅客行李測試以 3D X 光機進行前篩選(Pre-Screening)試驗，另於郵包中心裝設 3D X 光機加強偵測效能(附件 15)。

(三)生物安全的創新 (Biosecurity Innovation Program)

此節由澳大利亞農業部 Melissa Hindle 及 Jessica May 女士說明澳大利亞生物安全創新計畫的最新執行情況，包含發展高解析度 2D 及 3D X 光機之演算法(2D and 3D X ray Algorithm)建立自動偵測種子功能，目前已研發至第 3 階段，俟完成後即可投入現場作業，並應用於旅客行李及郵包檢查；利用機器人結合影像辨識，以遙控方式應用於航空器及車輛檢查，降低檢疫人員檢查時人身安全風險；使用環式紅外線設備(RingIR)對燻蒸用氣體，如溴化甲烷、硫醯氟(sulfuryl fluoride)及磷化氫(phosphine)即時偵測，確保燻蒸作業環境安全；以檢疫犬偵測各種動植物產品及有害生物，對表現最佳的檢疫犬行為進行遺傳試驗評估，於檢疫犬配戴加速偵測器(accelerometer)及心電圖(ECG monitor)等儀器，監測犬隻健康及表現之各項數據。尋求各種策略提升服務及風險管理措施，投資創新技

術及相關研發計畫，以應對各種新興生物安全挑戰，例如快速診斷及鑑定有害生物技術、識別褐翅椿象之行動裝置應用程式；未來將持續開發智慧穿戴裝置(realwear smart glasses)、大面積空拍影像分析(large scale aerial imagery)、遠端臨場機器人(Telepresence Robot)等創新技術。風險分析研究計畫持續識別新興有害生物風險，並提供解決對策，例如對於生物附著(biofouling)分析發現，船舶為海洋有害生物入侵的主要途徑，風險分析團隊與海洋生物安全小組共同合作進行多項研究，開發水下無人遙控載具(ROV)調查船體生物附著情形，風險小組由影像進行評估，提供風險預測及風險管理措施(附件 16)。

(四)閉幕式 (Meeting wrap-up, future direction, next QRM, theme finalisation,)

最後，由澳大利亞農業部的 Nathan Reid 先生就本次會議進行回顧，並指出本次會議分 4 天舉行，涵蓋的主題範圍非常廣泛，感謝包含我國在內的各講者分享各國經驗，與會各國代表之間應繼續合作與交流，期許下次會議能以實體方式舉行，進行更深入討論。

肆、心得與建議

（一）疫情期間，仍應積極參與 QRM 及 ICCBA 之技術性及研討會議

本次 QRM 討論主題廣泛而多元，且因透過視訊會議方式舉行，4 天總計約 600 人次參加會議，以往實體方式召開會議時，本局因人力及經費限制僅能 1~2 人參加，本次會議本局植物檢疫組、植物防疫組、動物檢疫組、企劃組及基隆、新竹及臺中分局皆派員參加且每次會議皆有多人線上參與，可吸取新知收穫豐碩。我國主講兩場次，分享我國於檢疫犬組隊建置及因應電子商務及郵包輸入檢疫物之應對作為，各國均感興趣並提問，有助提升我國國際活動參與度及國際可見度。除本次 QRM 會議採視訊會議方式進行外，ICCBA 的其他相關會議，如工作小組會議、全體會員大會及指導委員會仍因新冠肺炎疫情暫停召開，建議未來本局持續配合 ICCBA 秘書處之安排，積極參與各項會議活動及議題討論。

（二）藉由 QRM 會議各國經驗分享，精進我國植物防疫檢疫作為

2021 年舉行之第 12 屆 QRM 議題討論範圍由以往重點探討檢疫處理規範及相關技術議題，擴大為各參與檢疫單位對於檢疫管理系統之精進及改善之各議題經驗分享，本年度第 13 屆 QRM 延續前一年度議題，對於國際郵包及電子商務有害生物風險管理、各國建置檢疫犬隊的經驗及先進科技之應用或試驗計畫進行經驗分享及深入交流，其中利用先進科技進行檢疫各面向之應用，有許多值得參考借鏡之處，例如澳大利亞建置生物安全入口網處理臨場檢疫之派員排程及路線管理，可有效節省人力資源；使用 X 光機搭配演算法進行貨物、行李及郵包檢疫物偵測，由機器深度學習，找出可能違法藏匿之檢疫物，可以減少人工判讀影像可能發生的漏誤；以機器人進行車輛及貨櫃檢查、大數據的建置及分析等，將檢疫資源利用最佳化，並使邊境檢疫工作更加安全且有效率，值得各國參考。

（三）郵包及電子商務對檢疫之挑戰

近年雖然疫情使國際旅客出入境量驟減，但在國際郵包及電子商務交易方

面十分熱絡，逐漸形成一股新趨勢，檢疫物以郵包及海、空運快遞貨物輸入之檢查也成為今日各國檢疫機關面臨的新挑戰。紐西蘭初級農業部分享其對郵包輸入檢疫採行對策，係研發檢查貨物及小型郵件之自動化檢查系統，可節省人力並提升效率，另由郵局提供之國際郵包電子訊息(Electronic Advance Data, EAD)，可收集資訊並找出高風險郵包；我國則分享對國際郵包及電子商務輸入植物檢疫物強化管理措施之成效，藉由與海關跨機關合作、要求電子商務平臺業者配合、向大眾宣導等多項措施，降低跨境電商輸入違規檢疫物風險，獲與會人員高度興趣，顯示少量檢疫物透過郵包途徑違法輸入造成的生物安全風險，為各國關切及仍待解決的問題，建議我國亦可規劃與郵政公司合作進行類似郵包資訊之蒐集及分析。

（四）不確定環境下的創新檢疫對策

本次會議主題為「在不確定的環境下應用先進科技於生物安全管理措施」，由於新冠肺炎疫情影響，QRM 會議近兩年皆採線上會議，也因此讓更多防、檢疫人員有機會參與，而這正是一種在不確定的環境下使用先進科技的體現。除疫情外，環境破壞、氣候變遷、能源耗竭、政治動盪等不確定的環境因素下，如何快速應對並維持政府及社會的基本運作，已成為亟待思考與面對的問題。隨著科技與各項技術的進步及創新，有越來越多工具可投入應用於檢疫作業，以本次會議各國分享內容，包含人工智慧(資訊科技領域)、大數據分析及演算法(數學及資訊分析領域)、遙控機器人(網路及機械領域)、2D 及 3D 掃描 X 光機(物理機械與影像分析領域)等，均為跨領域技術之應用與合作，如何以新的思維，結合不同領域的研究成果，協助檢疫工作順暢執行、簡化程序與精進提升效率，將成為未來檢疫發展的方向。透過學習其他國家分享應用科技於防檢疫工作的經驗，了解各國植物檢疫之現行規定、具體作為與相關技術發展，及各國政府對生物安全的重視程度與執行力度（包含人力及資金投入規模），學習更多創意及創新思維來解決實務問題，以期未來邊境檢疫工作更有效能及更加安全便利。

伍、附件目錄


Australian Government
Department of Agriculture, Water and the Environment
New technologies for hitchhiker pest management
Sarah Bruce
Principal Director, Hitchhiker Pest Working Group
Department of Agriculture, Water and the Environment
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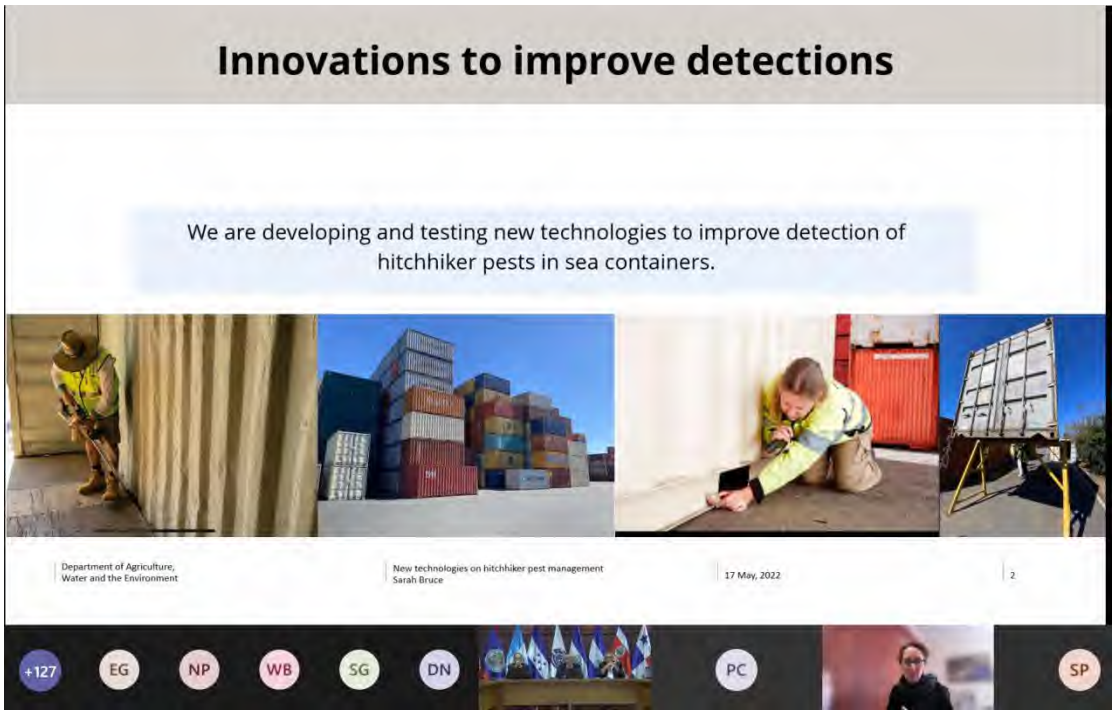
Innovations to improve detections
We are developing and testing new technologies to improve detection of hitchhiker pests in sea containers.
Department of Agriculture, Water and the Environment
New technologies on hitchhiker pest management
Sarah Bruce
17 May, 2022
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Hand-held hyperspectral camera system

Development of a system using hand-held hyperspectral cameras for the fast, real-time scanning of difficult to inspect areas of containers and approved arrangement sites.

Hyperspectral imagery provides a higher level of spectral detail than multispectral imagery and consequently should improve our ability to identify species and distinguish between them.

Biosecurity Automated Threat Detection System

Developing a camera system that will be installed on ship-to-shore cranes.

The cameras will combine with machine learning to scan the external surfaces of sea containers for pests and contaminants as they are unloaded from cargo ships.

Trial is scheduled to begin May 2022.

Environmental DNA and Point-of-Care technology for container sampling

Testing and validation of the eDNA/eRNA and point-of-care (POC) technology to allow for the rapid, cost-effective and reliable detection of hitchhiker pests. To be used across a wide range of commodities.

To date, we have:

- Developed eDNA/eRNA assays for khapra beetle, brown marmorated stink bug (BMSB), electric ant and Asian gypsy moth.
- Established methods to collect environment (soil) samples from shipping containers using handheld vacuum cleaners.
- Screened **about 2000 container samples** for khapra beetle, BMSB and electric ant using eDNA/eRNA.

We are also investigating eDNA metabarcoding approaches to broadly screen for insect species in container samples.

Phone app to detect BMSB

We have partnered with the CSIRO (Australia's national science agency) to develop a species identification tool for use on mobile phones.

The app uses artificial intelligence to provide fast, accurate recognition of brown-marmorated stink bug (BMSB).

The app can learn to tell the difference between a destructive stink bug and a harmless one.

We are trialing the app with our biosecurity officers to figure out its use, reliability and accuracy.

CSIRO

Detection capability (RingIR)

In 2020-21 we confirmed that RingIR technology could detect methyl bromide, sulfuryl fluoride and phosphine.

We are now exploring whether it can be extended to detect hitchhiker pests associated with containers (e.g. BMSB or khapra beetle).

Currently, we are testing to see if it can detect native species. A future project may be funded to test on exotic pests of concern.

RingIR

Piloting 4WD robot for inspections

Piloting the use of the Hades-5Z robot as a supplementary tool when inspecting vehicles, heavy machinery and containers to increase our risk detection capabilities.

This removes the need to raise a vehicle, machinery or container, making inspections safer and more efficient.

The pilot commenced March 2022.

OIRSA actions to prevent the spread of African Swine Fever (ASF) in the Dominican Republic (DR)

Abelardo De Gracia
(adegracia@oirsa.org)
Dirección Regional de Salud Animal

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Prevention in the country (2018-2022)

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What have we done?

- October 2018: development and dissemination of general recommendations to prevent entry of the illness.
- March 2019: *Virtual Regional Seminar on African Swine Fever,* (Veterinary Medicine Faculty of the San Carlos de Guatemala-Colegio University)
- From March to July 2019: Procurement of ASF diagnostic kits.

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What have we done?

- April 2019: Development and dissemination of
  - Alerts on the danger of importing animals and products from ASF affected countries.
  - Recommendations to prevent the introduction of the virus in the OIRSA region, with more specific recommendations.

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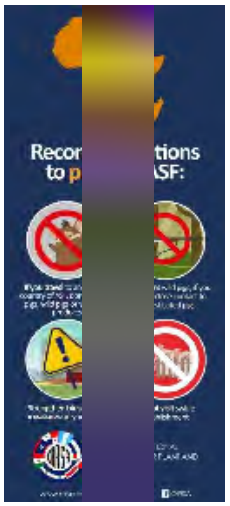
What have we done?

- April to August 2019: Development of information materials in English and Spanish made available to countries:
  - Video (1 in Spanish and 1 in English)
  - Flyers (3 in Spanish and 3 in English)
  - Infographic
  - Brochure



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What have we done?

- June and August 2019: Presentations on African Swine Fever to experts and producers from:
  - Nicaragua (11 June)
  - Panama (8 and 9 July)
  - Honduras (31 July – 2 August)
  - Guatemala (23 September)
  - Costa Rica (25 September)

- July 2019: Visit to the El Salvador Ministry of Agriculture and Livestock for the launch of the ASF prevention plan.

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What have we done?

- July 2019 to June 2020: Development and dissemination of ASF regional risk analysis.
- October 2019: ASF regional simulation in Guatemala.
- February 2022 to now: Revision of the ASF risk analysis.

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What have we done?

- Mobile application "OIRSA library" (Android) with the following material:
  - Regional manual of good practices for the managment of health emergencies (attachments for diseases including ASF, materials and devices, disaster management).
  - Sanitising manual for animal health.
  - Videos:
    - How to put on and take off biosecurity apparel
    - Taking and sending samples
    - General information on ASF
    - Management of ASF waste
    - **Biosecurity safe disposal of ASF carcasses**
    - Necropsy in bovines, **pigs** and sheep
  - Discussions:
    - **Biosafe disposal of pig carcasses affected by ASF**
    - **Cleaning and sanitisation procedures for facilities and vehicles with presence of ASF**

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OIRSA actions in the face of an ASF outbreak in the Dominican Republic 2021-2022

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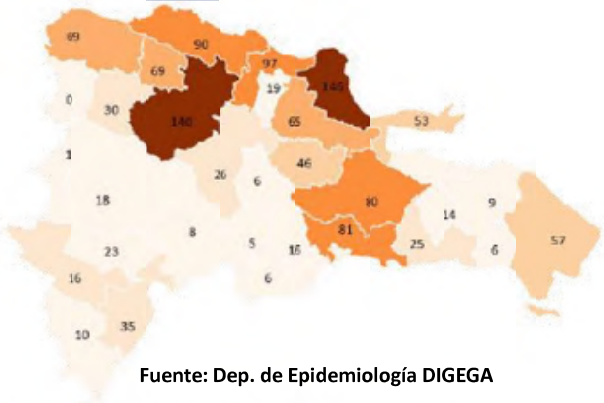
Epidemiological situation

Estimated population

- Commercial farms: 334 farms with around 62,000 breeding sows
- Backyards: Estimated between 40,000-60,000 breeding sows
- Total: between 1.8 to 2 million pigs (estimate from the July 2021 census).



Fuente: Dep. de Epidemiología DIGEGA

Figura 5. Mapas de focos acumulados de PPA por provincia a la semana epidemiológica 18.

Current situation

From 1 to 7 May 2022

- # of accumulated outbreaks: 1,276 in 30 of the 31 provinces.
- # of pig outbreaks: 1,009.
- # of outbreaks in the erradication process: 267.
- 3,248 producers sampled.

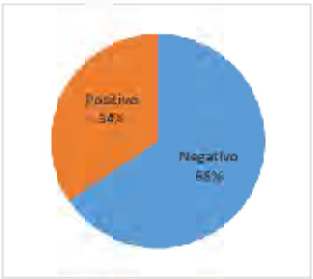
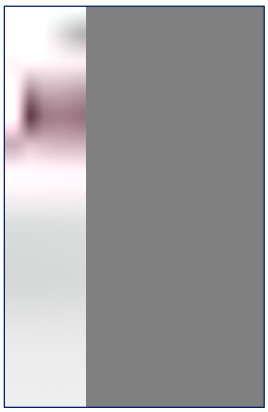
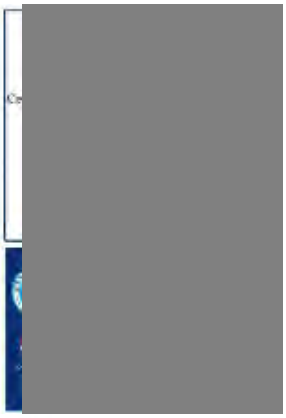


Figura 7. Gráfico del porcentaje de casos positivos y negativos.

What are we doing?

- Emergency focus: **containing the outbreak.**
- Technical assistance at a central level and in the field from 48 hours following declaration of ASF outbreak in DR.
- Assigning emergency funds for containement and control of the outbreak in DR (US$248,345.48/phase 1), as well as one-off payments to prevent ASF entry into countries free of the disease and continued support for DR (US$551,000.00 for DR and US$493,226.92 for unaffected countries/phase 2).
- Formation of the Committee for the Erradication of ASF.
- Implementation of ASF diagnostic techniques in LAVECEN (RT-PCR, ELISA Ac).





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What are we doing?

- Development and implementation of the epidemiological monitoring platform from the Ministry of Agriculture (epidemiology, laboratory, preservation brigade, dumping grounds, etc.)
- Revision, development and dissemination of information materials (posters, flyers, videos).
- Arrangements for joint coordination with other liaison agencies (OIE, FAO, IICA, USDA/APHIS).
- Virtual and in person training sessions exclusively for veterinary services in DR.
- Regional information sessions on the sanitary situation in DR and updating the different components of sanitary crisis response.

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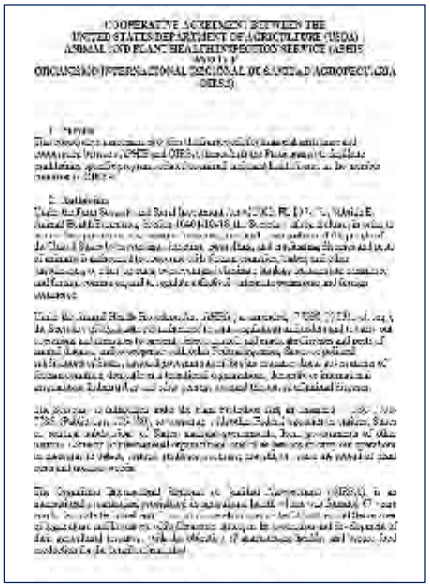
What are we doing?



- USDA-APHIS Project for the control and eradication of ASF in DR (3 action plans).
- Proposal to strengthen the national tracability program and adapt internal movement controls.

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Necessary Measures

Quarantine Services	Production Sector	Veterinary Services

• Strengthen the primary line of defence in ports, airports and land borders through intrusive and non-intrusive inspections.
  • Canine pairing
  • Scanners (image interpretation)
  • International waste treatments.
	• Strengthen biosecurity on farms
	• Establish a swine traceability system and update national census.
	• Implement a control for internal movement of pork products and sub products at the national level.
	• Strengthen the public-private alliance
	• Establishment of a suitable education and communication campaign for the general public and media
	• Revision and adaptation of local regulations.
		• Update of national emergency plans and early warning.
		• Formulation and training of response teams.
		• Strenghtening of ASF diagnostic laboratories.
		• Establishing protocols for:
		• VE
		• Humane slaughter
		• Taking and sending samples
		• Disposal of carcasses
		• Cleaning and sanitisation.

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“Be the change you wish to see in the world”
Mahatma Gandhi

1

Use and Management of Quarantine Detector Dogs in Taiwan

Chen-Chung Chen

Bureau of Animal and Plant Health Inspection and Quarantine

2022.5.16

Contents

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I. Detector Dog Team: History and Development 1/3

3

- In 1984, the U.S. Animal and Plant Health Inspection Service (APHIS) launched the Beagle Brigade inspection program at the Los Angeles International Airport.
- In 1998, Taiwan customs streamlined inspection procedures and relied on voluntary declaration. Passengers with nothing to declare passed through designated green lanes, while those with items to declare stopped for inspection at the red lanes. Detector dogs were also planning to help quarantine inspection.

Country	Number of detector dogs
United States	119 (to be increased to 179 in the future)
Japan	140
New Zealand	33
Taiwan	56

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Bureau of Animal and Plant Health Inspection and Quarantine, COA

I. Detector Dog Team : History and Development 2/3

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- In March 2002, 3 detector dogs and 3 our quarantine officers were trained at the APHIS National Detector Dog Training Center.
- In June, detector dogs returned to Taiwan. The Training Center sent a trainer to Taiwan to supervise training.
- In October 2002, the three detector dogs were deployed at the Taoyuan airport and Kaohsiung airport.

I. Detector Dog Team: History and Development 3/3

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- In 2004, a trainer from New Zealand was invited to conduct training in Taiwan. The first batch of locally trained detector dogs completed training in the same year.
- In August 2005, the detector dog training center at National Pingtung University of Science and Technology was inaugurated.
- In 2005, detector dogs were deployed for the inspection of mail and courier parcels.
- Currently, there are 4 trainers, 2 assistant trainers, 43 handers, and 56 detector dogs.

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Bureau of Animal and Plant Health Inspection and Quarantine, COA

II. Operations of the Detector Dog 1/3

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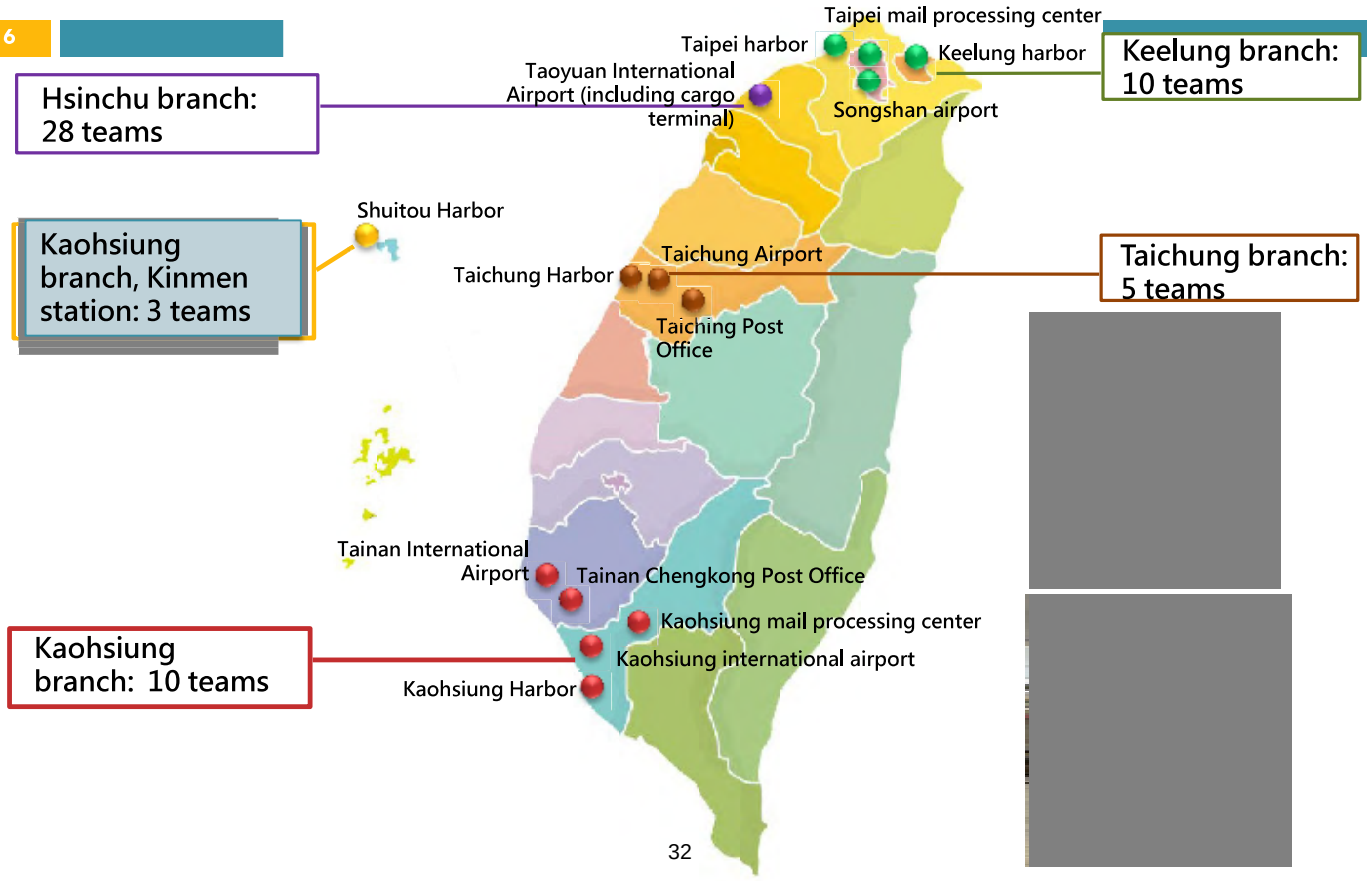

II. Operations of the Detector Dog 2/3

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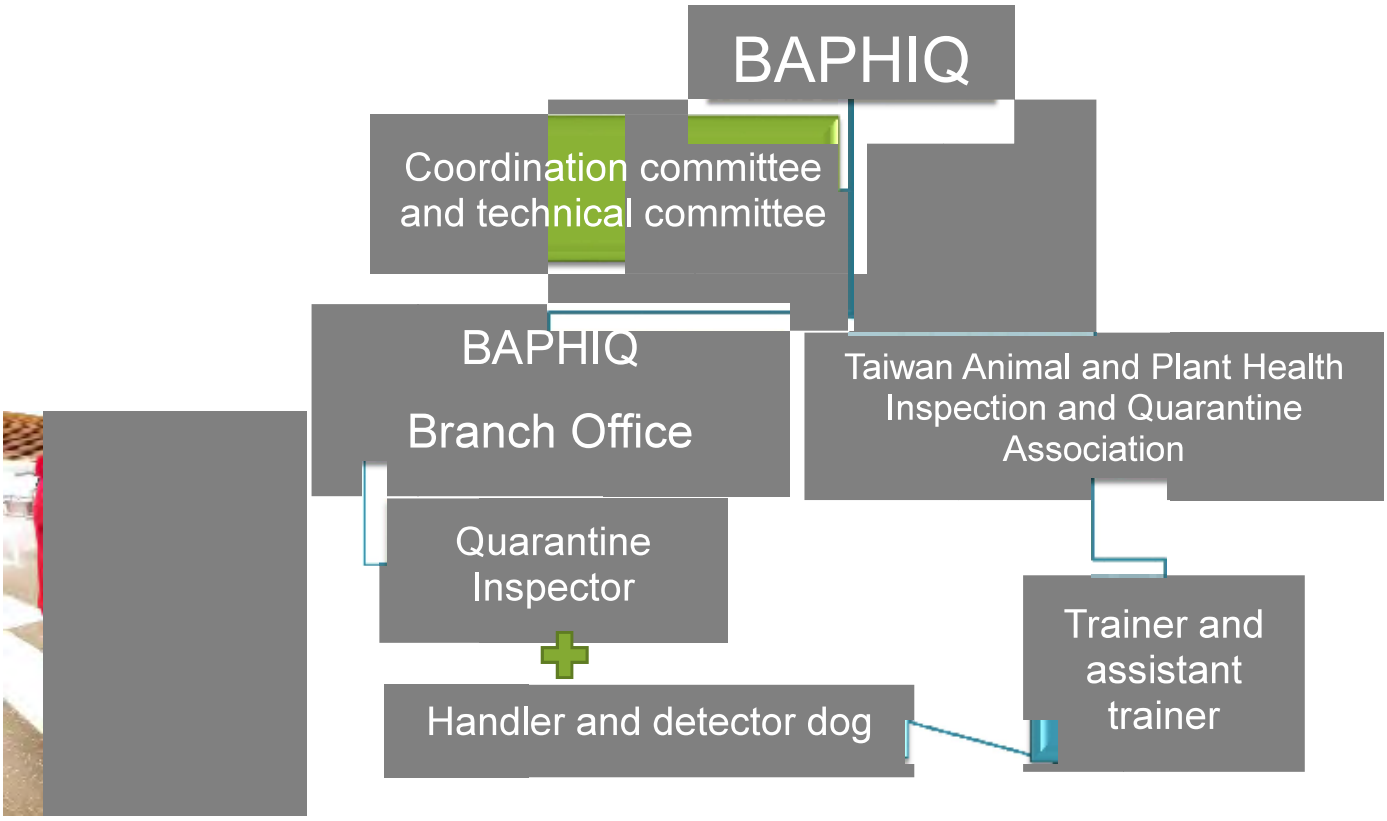

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II. Operations of the Detector Dog 3/3

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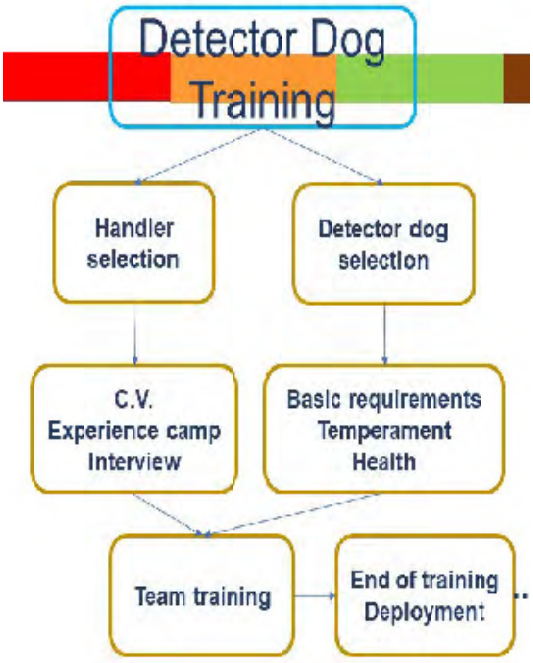
Detector Dog Operations and Management Manual



Working conditions of the personnel comply with the *Labor Standards Act*.

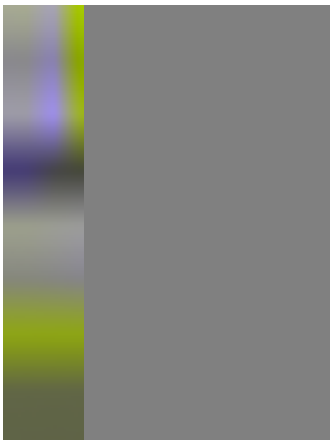
Dog welfare complies with the stipulations of the *Management and Care of Canine on Duty at Government Agencies*.

III. Achievements of Detector Dog Operations 1/4

9

Detection Results (Including passengers, mails, and courier)

Year	Detector dog teams	Number of flights inspected	Successful Detections	Total items seized (Kgs)
2017	45	53,747	56,883	68,527
2018	47	66,442	61,920	70,508
2019	50	80,739	29,598	15,713
2020	56	16,807	4,875	5,997
2021	56	10,139	3,244	7,960



農業委員會動植物防疫檢疫局
Bureau of Animal and Plant Health Inspection and Quarantine, COA

III. Results of Detector Dog Operations 2/4

10

Mail and express parcels detection results in the last three years

Year	Mail			Express parcel		
	Number of inspection	Number of seized	Total weight seized (kg)	Number of inspection	Number of seized	Total weight seized (kg)
2019	267	125	670	375	25	133
2020	1,150	425	2,600	588	115	978
2021	1,374	645	4,593	1,292	432	2,395

III. Results of Detector Dog Operations 3/4

11

Public awareness on Animal and Plant Quarantine -1

Media report on the Premier's inspection of the quarantine inspection operations during the Chinese New Year

New Media interview of a YouTuber

農業委員會動植物防疫檢疫局
Bureau of Animal and Plant Health Inspection and Quarantine, COA

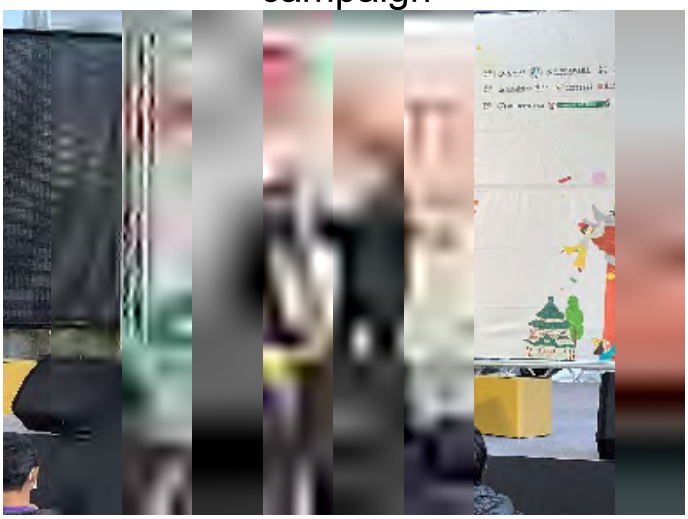
III. Results of Detector Dog Operations 4/4

12

Public awareness - 2

BAPHIQ Facebook page

Demonstration at a promotion campaign



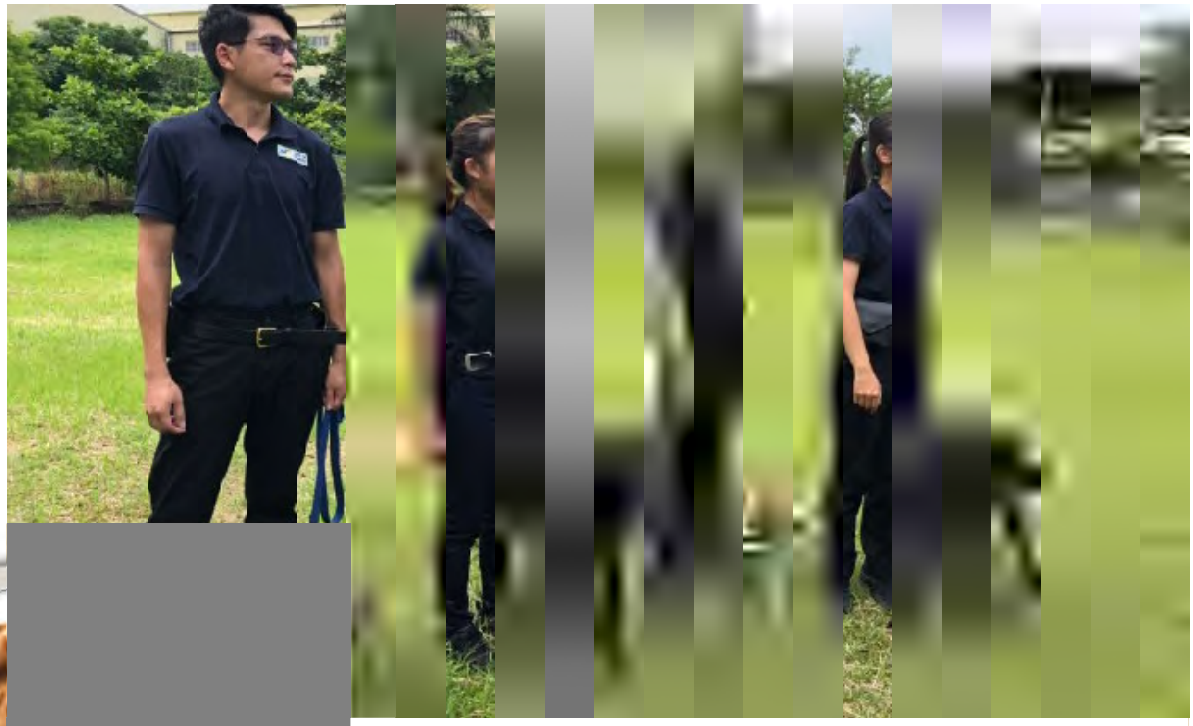
IV. Conclusion

13

Maintain an appropriate number of dogs to assist border quarantine detection and public outreach requirements

Establish long term technical cooperation with US and New Zealand or other countries to provide training dog or breeding techniques to maintain stable supply of detector dog.

4,27,2022 Video technical meeting with New Zealand



Thank you

Strengthening Biosecurity Excellence in the Mail Pathway

- Collaboration between MPI, NZ Post and Customs to implement a world class processing centre in Auckland.
- Use of advanced electronic data combined with intelligence tools that will identify biosecurity threats and highlight items of zero threat.
- Investment in innovative 3D scanning technology to enable threat identification.
- Developing the construct of artificial intelligence to detect biosecurity threats.
- Implement measures to increase efficiency while designing a sustainable operating model for future threats and rising volumes.

Ministry for Primary Industries Objectives:

- To develop the mail pathway in a smarter and safer way through technology and operational enhancements.
- Continue to eliminate and mitigate Biosecurity threats and maintain New Zealand's Biosecurity system as a national asset.
- Reset responsibilities between MPI and NZ Post based on modern UPU network characteristics, Transitional Facility requirements and current legislation.
- Partner with NZ Post and NZCS to provide the safest environment for our people to work in.
- Share resources and knowledge to complement partnership objectives in the mail network.
- Increase effectiveness and efficiency to maintain close to current levels of manual effort.

Three Fundamental Changes

Infrastructure – Auckland Processing Centre

Technology – 3D Scanning, Threat Detection Algorithms, Smart Tracking and Communication between Border Agencies and NZ Post

DATA – UPU Inbound Data (Data for Mail) prior to arrival and Agency Intelligence Engines

Ministry for Primary Industries

Biosecurity New Zealand

Auckland Processing Centre

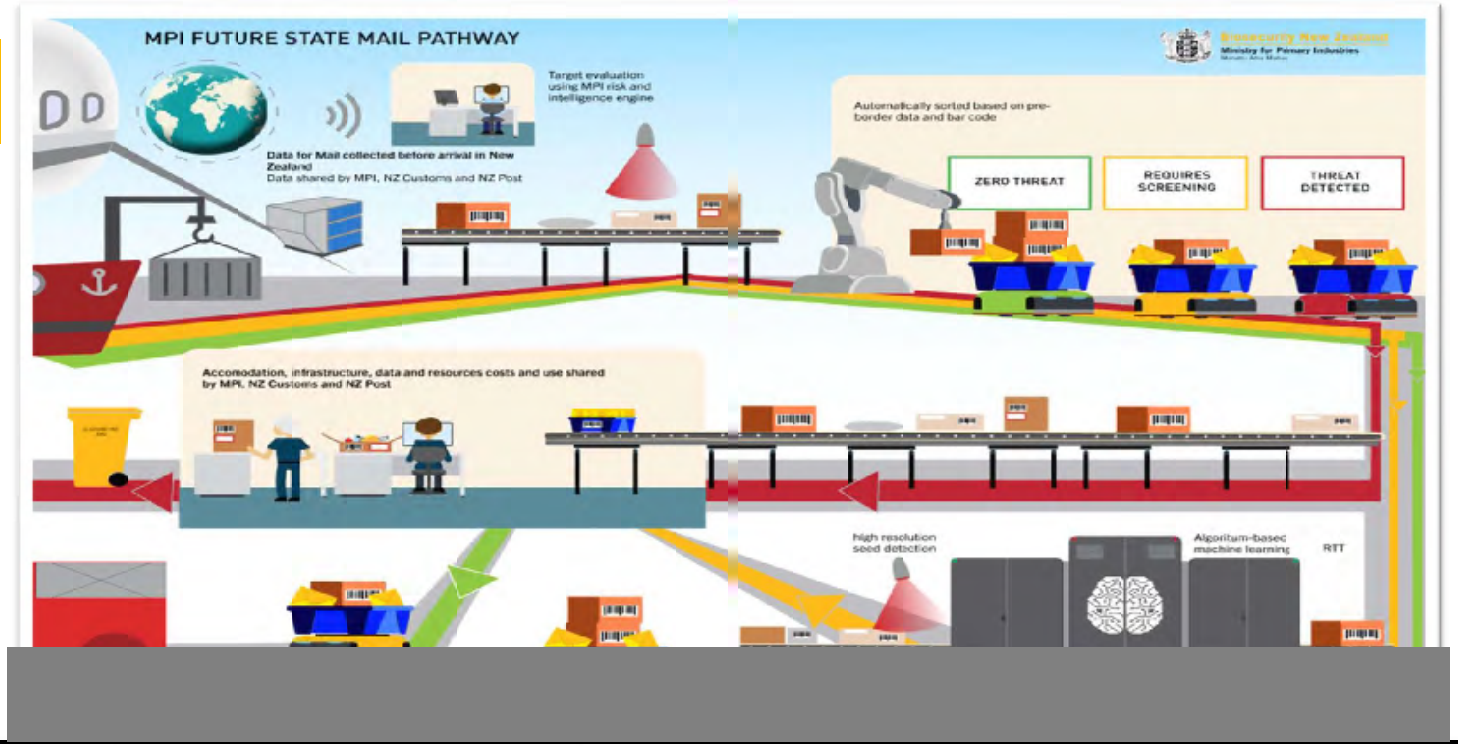
- Secure transport from Air Cargo Terminal
- Modern Sortation and Material Handling System
- Border Agency Designed Inspection Facilities

3D Scanning Technology

- Superior imaging
- Algorithm support
- Curtainless shrouds
- Small format versions for small packets

Electronic Advance Data

- Pre-clearance of Zero Threat items
- Threat Targeting via Agency Risk and Intelligence Engines
- Data collection for development and maintenance of threat Profile Libraries


MPI FUTURE STATE MAIL PATHWAY
Biosecurity New Zealand
Ministry for Primary Industries
Target evaluation using MPI risk and intelligence engine
Data for Mail collected before arrival in New Zealand
Data shared by MPI, NZ Customs and NZ Post
Automatically sorted based on pre-border data and bar code
ZERO THREAT
REQUIRES SCREENING
THREAT DETECTED
Accomodation, infrastructure, data and resources costs and use shared by MPI, NZ Customs and NZ Post
high resolution seed detection
Algorithm-based machine learning
RTT

Situation of Giant African Snail, and control and eradication actions

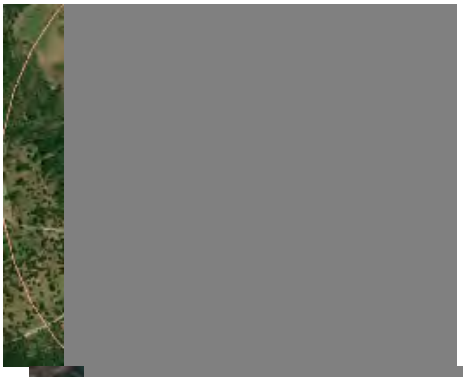
Achatina Fulica

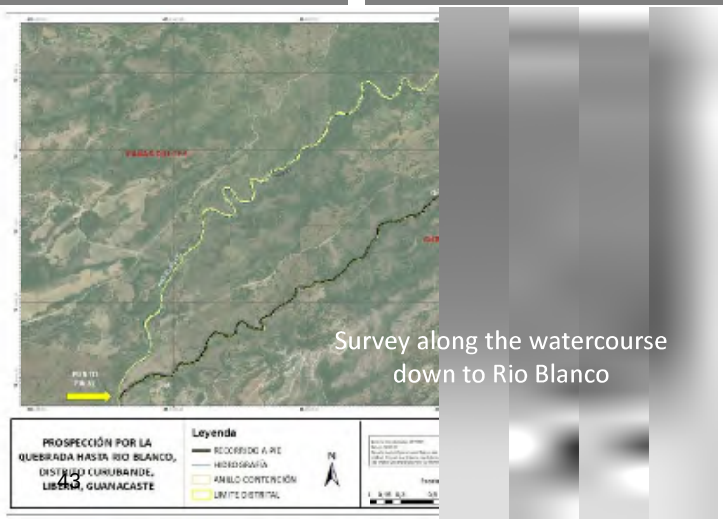
Leonardo Vásquez Mendoza
Unidad Regional Chorotega
Departamento de Operaciones Regionales

NATIONAL DETECTION **CURUBANDÉ**

LOCATION OF THE GIANT SNAIL INITIAL DETECTION POINT AT CURUBANDÉ, LIBERIA, GUANACASTE

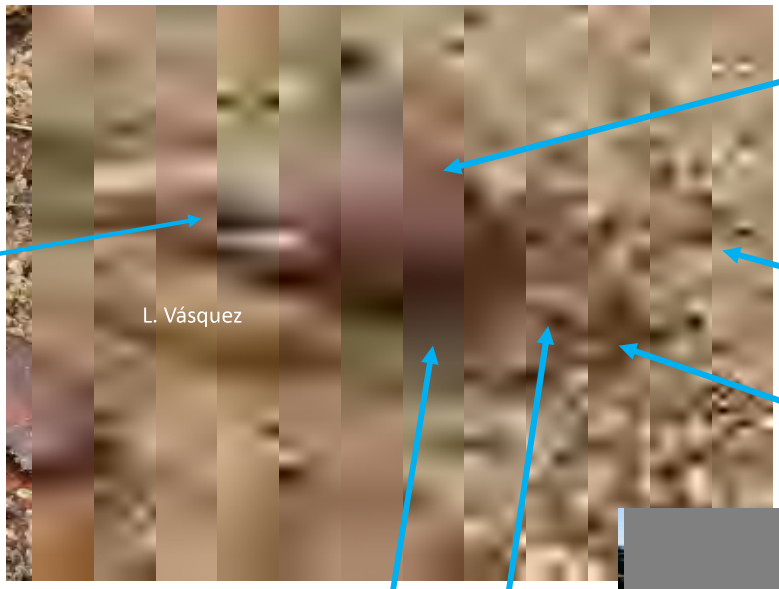
DELIMITING THE OUTBREAK





Survey along the watercourse down to Rio Blanco

LEARNING



CONICAL AND ELONGATED SHELL

ALTERNATED STRIPS ON THE SHELL BROWN AND YELLOWISH-BEIGE

FOUR SHORT TENTACLES OR "ANTENNAE"

BROWN STICKY BODY

Species confirmation and publication of presence

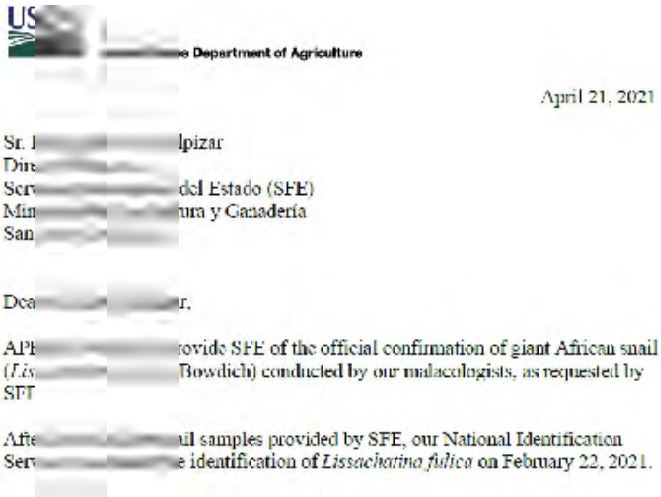

"WAYBILL DOC"

TDT DHL

CR-SCR-SCG US-PHL-PHLPHLB

0.5 kg

WAYBILL 46 0838 1643


Department of Agriculture

April 21, 2021

del Estado (SFE)

tura y Ganadería

ovide SFE of the official confirmation of giant African snail (*Li* Bowdich) conducted by our malacologists, as requested by SFE

il samples provided by SFE, our National Identification identification of *Lissachatina fulica* on February 22, 2021.

Det
=Li

Detection of Giant African Snail (Achatina fulica=Lissachatina fulica) in Costa Rica

Declaration of Emergency

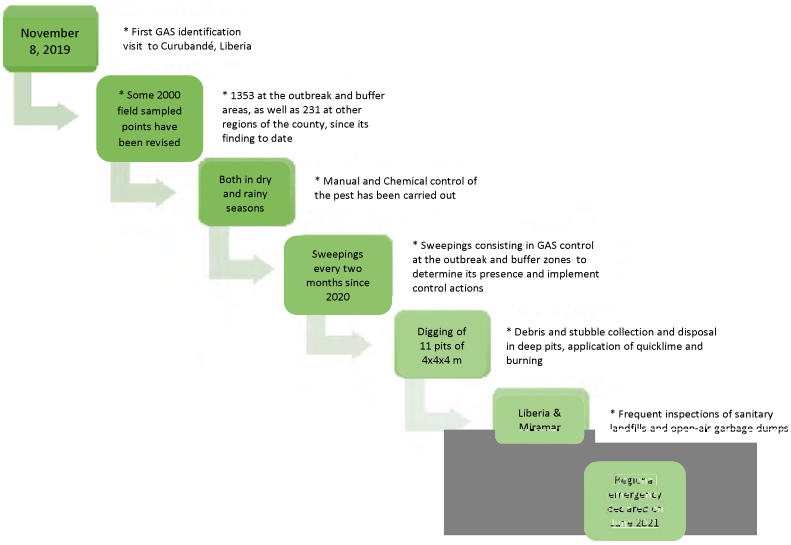
State of National phytosanitary emergency for prevention and control of Giant African Snail (Achatina fulica)

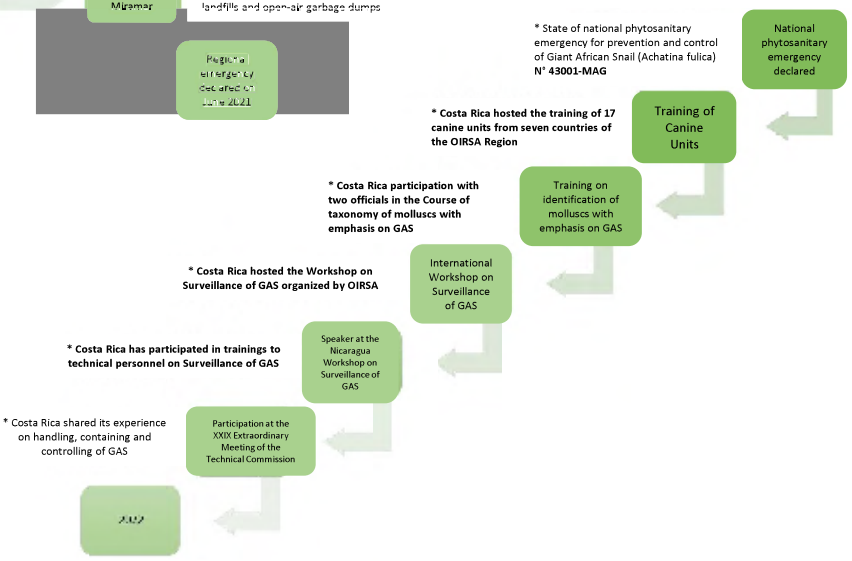
No. 43001-MAG

THE PRESIDENT OF THE REPUBLIC

AND THE MINISTER OF AGRICULTURE AND HUSBANDRY

June 2021





SURVEYS AT NATIONAL LEVEL

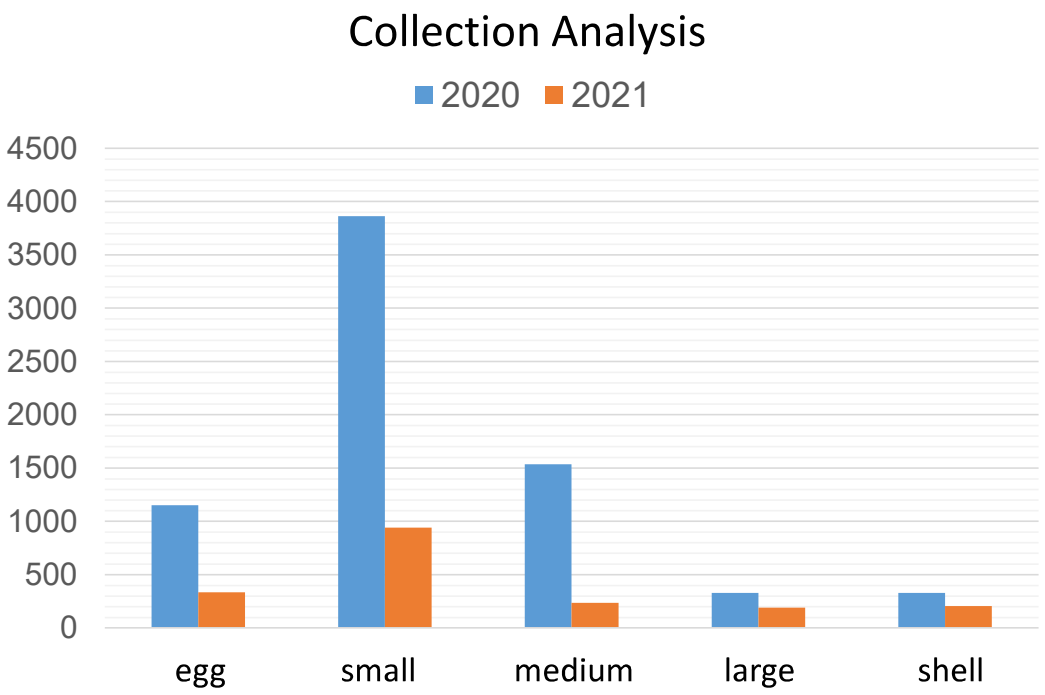
MAP OF FINDINGS OF GIANT AFRICAN SNAIL FROM OCTOBER 2019 TO MAY 11, 2022 AT NATIONAL LEVEL, CURUBANDÉ, LIBERIA, GUANACASTE

Status of GAS

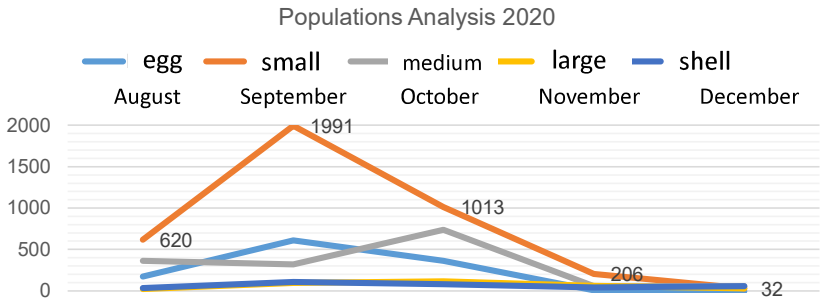
Presence of shells and live GAS during the X survey

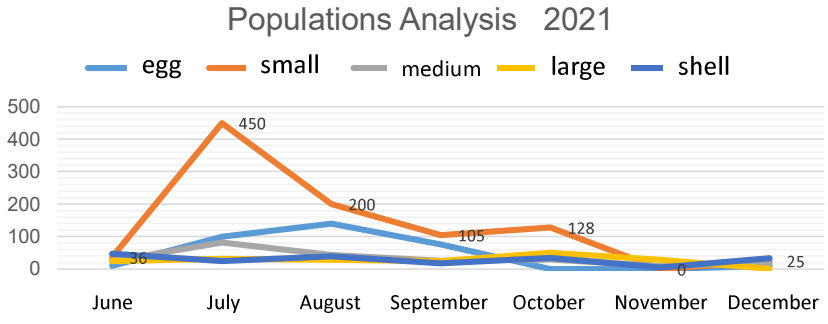
Prospected zones during the X survey

Population Analysis



COLLECTION AND CAPTURE BEHAVIOUR





Control

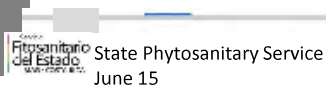





Control





State Phytosanitary Service
June 15

Countries in combat for prevention and control of giant snail
National and regional phytosanitary emergency declared for prevention and control of Giant African Snail

- National authorities declared...

CHECK YOUR VEHICLE

- Do not visit the area unless strictly necessary

- Ideal to check the vehicle before leaving the zone where the snail has been detected, as it easily adheres to cars, trucks and other vehicles, posing the risk of dissemination to other areas, which is to be avoided at all costs.

MAKE YOUR REPORT

Call the Regional Unit Chorotega at Liberia

Tels. 2549-3635, 2549-3636, 2549-3400

E-mail: lvasquez@sfe.go.cr o grodriguez@sfe.go.cr

Our experts shall know how to correctly dispose of the snail to prevent its spreading

SPACE FOR QUESTIONS

LEONARDO VÁSQUEZ
REGIONAL UNIT CHOROTEGA
lvasquez@sfe.go.cr
25493635
25493636
85008155

DETECTION OF GIANT AFRICAN SNAIL USING CANINE UNITS

Achatina fulica

AGRICULTURA
SECRETARÍA DE AGRICULTURA Y DESARROLLO RURAL

SENASICA
SERVICIO NACIONAL DE SANIDAD, INOCUIDAD Y CALIDAD AGROALIMENTARIA

2022 Ricardo Flores Magón
Año de
PRECURSOR DE LA REVOLUCIÓN MEXICANA

Mayo de 2022

Background

Dominican Republic
November 2016. presence of Giant African Snail (*Lissachatina fulica* or GAS), was first found at the Bávaro Golf Camp, Punta Cana, Municipality of Higüey, Province of La Altagracia.
https://www.oirsa.org/contenido/2020/II_jornada_presentaciones/CARACOL%20GIGANTE%20AFRICANO.pdf

Costa Rica
April 2021. The State Phytosanitary Service (Servicio Fitosanitario del Estado (SFE)), detected presence of Giant African Snail (*Achatina fulica*), at the Curubandé District, Canton of Liberia, at Guanacaste Province. A 1000 m diameter contention ring was set starting from the point where the first specimens were identified, covering a 78 hectare area where the snail has ben contained.
https://www.ippc.int/en/countries/costa-rica/pestreports/2021/04/deteccion-del-caracol-gigante-africano-achatina-fulica-lissachatina-fulica-en-costa-rica/

SENASICA

Food and Agriculture Organization of the United Nations

The Regional International Committee for Agricultural Health (CIRSA), (Comité Internacional Regional de Sanidad Agropecuaria) **declares regional phytosanitary emergency for Giant African Snail.**

Wednesday, July 7, 2021.

https://www.oirsa.org/noticia-detalle.aspx?id=8090

ORGANISMO INTERNACIONAL REGIONAL DE SANIDAD AGROPECUARIA
Por una región libre de plagas transfronterizas

Designing and teaching of a training course to imprint the *Achatina fulica* aroma in the canine smell memory

SENASICA

ORGANISMO INTERNACIONAL REGIONAL DE SANIDAD AGROPECUARIA

Por una región libre de plagas transfronterizas

INTENDED FOR 17 CANINE UNITS FROM:

México	(4)
Guatemala	(3)
El Salvador	(2)
Honduras	(2)
Nicaragua	(2)
Costa Rica	(2)
Panamá	(2)

3

SENASICA

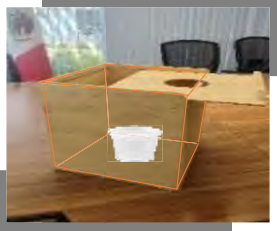
Data to be considered :

The activities were performed at **ground zero**, where the presence of Giant African Snail was reported; **all** precautions were taken for access to and exit from the working area, like using sanitary boot covers and carpets with disinfecting substances and molluscicides, provided and supervised by OIRSA and the SFE CR

4

- Due to public health risks, direct contact of the dog and the handler with the snail must be avoided.

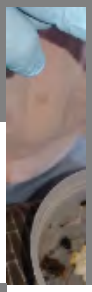
- Designation boxes in combination with plastic containers proved to be ideal to avoid contact of the dog with the sample, thus reducing contact risks for handling



To maintain a level of security, in addition to wearing gloves and tongs when handling the samples, the surfaces of the material utilised were disinfected with alcohol 90% in order to:

•Avoid sanitary risks of transmission of mollusc hosted microorganism

•Avoid aromatic markers left by the dogs, like remains of saliva and glandular secretions



Collaboration

Designing and teaching of a training course to imprint the *Achatina fulica* aroma in the canine smell memory

The workshop results should be a methodology to work the aroma without the need of displacing the risk to countries where de GAS is absent. For this reason, sterile cotton gauzes moistened with distilled water were placed in plastic recipients to collect the snail secretions.

7

Collaboration

Designing and teaching of a training course to imprint the *Achatina fulica* aroma in the canine smell memory

Most of the canine units were trained in Mexico, the rest worked under the positive reinforcement methodology. Thus, the conditioning, association and imprint of the aroma were carried out without any major hindrance during the one-week established period.

Assisted marking in presence of aroma

Observing the changes in behaviour and response conditioned by the target aroma

Precise location of the aroma source trough the command "Where"?

8

ASPECTS AFFECTING THE DEVELOPMENT:

Positive

- The training had full support from the SFE CR and OIRSA.
- High commitment of participants.
- The support from local individuals in carrying-out the activities

Negative

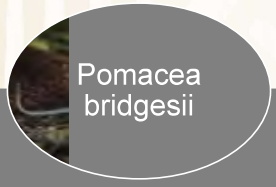
- The activities were performed in a region with tropical climate, with a temperature range from 24 to 32º C and relative humidity of 65 to 89%; consequently, some dogs resented the weather change by certain initial adaptation difficulties.

RESULTS

- All 17 dogs achieved *Achatina fulica* aroma imprint
- The gauzes in the plastic recipients were used to challenge the dogs and confirm their capability to respond to the collected secretions (slime and excrements) in the gauzes.
- The collected gauzes were examined one-by-one by a committee to verify the absence of eggs, and were handed to the participant countries to continue with the reinforcement work and to replicate the imprint of the aroma in other canine units, without displacing any risks.

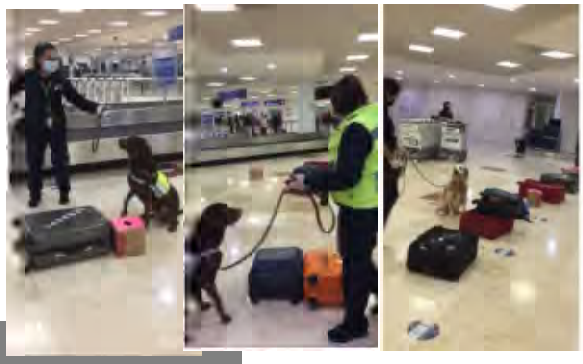
Post-training work in Costa Rica

- Indefinite duration when kept frozen.
- Approximate use time: two weeks. Refrigerate after using, dispose by incinerating.



Achatina fulica

- Odour generalization is viable utilizing other species of snails, showing an assertive response when challenged with GAS impregnated gauzes.



- 79 canine units have been trained in México to detect GAS

AGRICULTURA
SECRETARÍA DE AGRICULTURA Y DESARROLLO RURAL

SENASICA

1

Strengthening Phytosanitary Measures for International Mail Articles and E-Commerce

Yu-Ling Jhang, BAPHIQ (Taiwan)
May 19, 2022

2

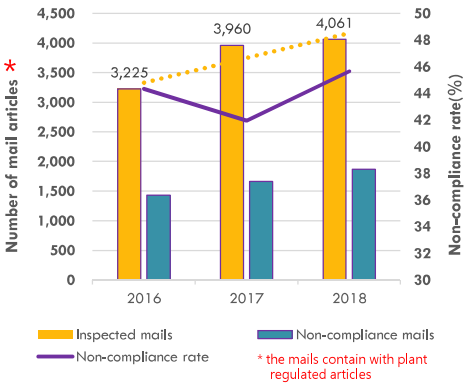
Introduction

- According to the "Regulations Governing Customs Clearance Procedures for Importing and Exporting Postal Parcels", "postal articles" are defined as imported and exported postal mails and parcels delivered by the postal authority.
- Postal Authority: the competent authority for the Postal Act is the Ministry of Transportation and Communications (MOTC). In order to provide postal services, the MOTC has established the state-run Chunghwa Post Co., Ltd.

Risk increasing

3

- In most cases, there are no real duty-payers, and the recipients have no obligation to declare the correct goods in the parcel. Therefore, many recipients have a fluke mentality and want to encapsulate the imported quarantine items by parcel delivery.
- e-Commerce or delivery by international mails or parcels have become an important new trading pathway, especially during the pandemic.
- The growing e-commerce market means that an unprecedented number of parcels and small packages are being exchanged across borders. This shift in trade patterns, along with the challenge of screening and preventing the entry of unauthorized goods, increases the risk of introduction and spreading of pests into new territories.



Decisions made and communications

4

- In order to reduce the import quarantine risk of postal parcels and to prevent the quarantine articles that people want to import do not meet the quarantine regulations and fail to pass customs, and after referring to the practices of the United States, Japan, and other countries, the Plant Protection and Quarantine Act was amended in 2018.
- Internal discussion meetings on the draft of the Regulations, practical procedures for this change, programe designing for on-line application system for import permit were held.
- Recipient briefings and stakeholder communications were implemented by local branches.

https://smartpq.baphiq.gov.tw

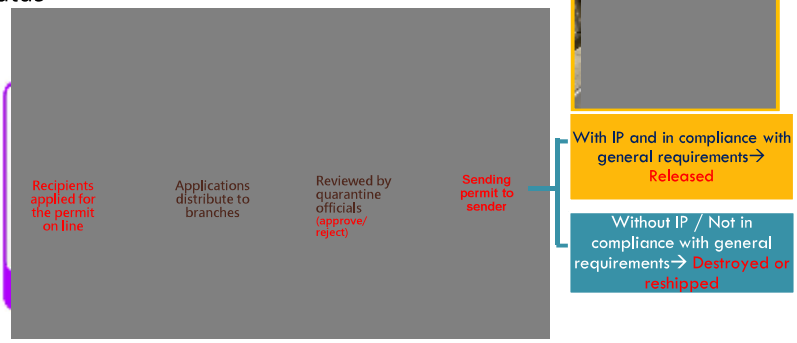
Strengthening measures

5

- The Regulations for Quarantine of Plant Regulated Articles Export and Import by Mail was published on May 30, 2019 and entered into force on June 20, 2019.
  - ✓ Plant regulated articles shall not be sent by mail; otherwise, the articles will be reshipped or destroyed. However, recipients who applied to the plant quarantine authority for approval of entry in advance are exempted.
  - ✓ The regulated articles that are imported by mail shall be packaged with a legible label indicating the content. Also, the postal authority shall cooperate with the plant quarantine authority to inform the recipient to apply for quarantine from the authority.
  - ✓ The recipients who receive mails without quarantine checking shall notify to the plant quarantine authority immediately upon receiving them. Otherwise, a fine ranging from NT$30,000 (US$1,075) to NT$150,000 (US$5,080) shall be imposed.

6

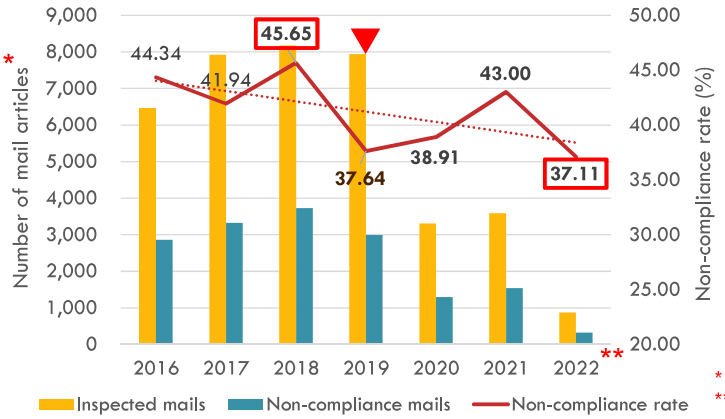
- Flyers for the Regulations are made in 8 different languages.
- Strengthening the spot examination by Customs officials
- Review and adjust measures based on implementation status



Results

7

- Non-compliance rate decreased from 2019 to 2022



(▼The Regulations for international mails entered into force on June 20, 2019.)

* the mails contain with plant regulated articles

** the data for 2022 is for the first quarter of the year

8

	Jan. – Jun., 2019	Jul. – Dec., 2019	Jan. – Jun., 2020	Jul. – Dec., 2020	Jan. – Jun., 2021	Jul. – Dec., 2021	Jan. – Mar., 2022
Inspected mails in total	1,586	2,383	1,490	1,823	1,759	1,834	873
Non-compliance mails in total	709	785	520	769	747	797	324
Without permit / Total non-compliance (%)	--	33.6	46.7	51.6	55.0	62.2	57.4
Prohibited plants/ Total non-compliance (%)	25.4	40.3	33.7	31.3	28.1	18.1	25.3

* There are still some recipients do not apply for the permit. Most of them are foreign workers or immigrants from Thailand, Indonesia and China. Some recipients even try to conceal other non-approval plants.

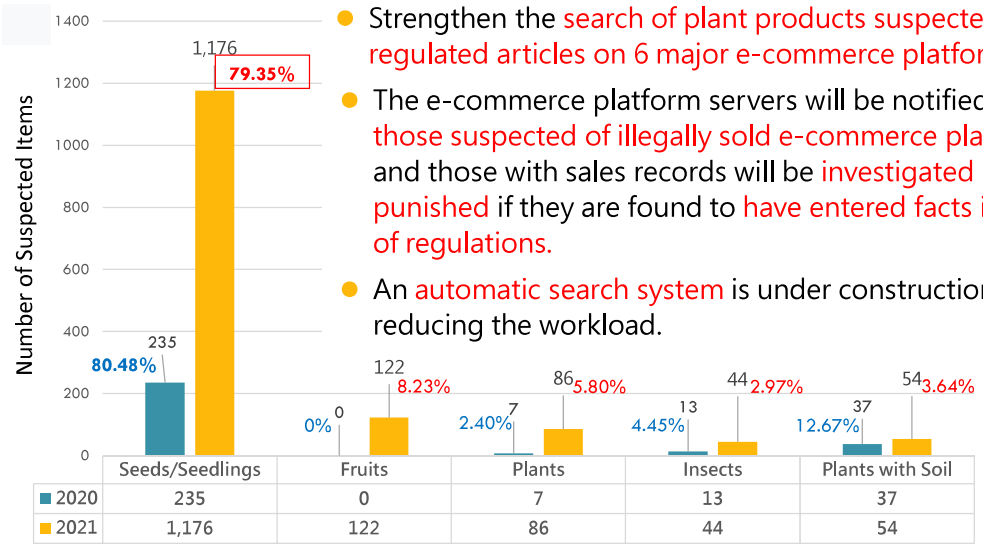
9

Other non-compliance (%)	Jan. – Jun., 2019	Jul. – Dec., 2019	Jan. – Jun., 2020	Jul. – Dec., 2020	Jan. – Jun., 2021	Jul. – Dec., 2021	Jan. – Mar., 2022	Increase or decrease
Without PC or incorrected AD	63.9	13.6	9.8	9.1	9.2	11.7	8.3	↓
Plant with soil	6.2	3.3	3.3	4.2	3.3	3.1	2.5	↓

- The recipients can realize the import requirements more while applying for the permit.
- Therefore, they can inform the senders to prepare the mails to avoid violation of the requirements.

Phytosanitary measures on e-commerce products

10



- Strengthen the search of plant products suspected to be plant regulated articles on 6 major e-commerce platforms
- The e-commerce platform servers will be notified to remove those suspected of illegally sold e-commerce plant products, and those with sales records will be investigated and will be punished if they are found to have entered facts in violation of regulations.
- An automatic search system is under construction for reducing the workload.

Conclusion

11

- The number of international mails is increasing annually. This permit system can reduce the biosecurity risk of unpredicted parcels and harmful pests being introduced through unapproved items.
- The online application permit system was established with Chinese and English interfaces for recipients to submit applications and for quarantine officials to review. The electronic operation is easy, convenient and efficient.
- Online search and removal of suspected illegal products from e-commerce platforms can help reduce the import violation.

Conclusion

12

- More public awareness is needed：
  - There are still some recipients do not apply for the permit, or do not notify the senders to prepare the mails in accordance with the requirements stated on the permit, and even try to conceal other plants that are not approved.
  - There are still some illegal express parcels ordered through e-commerce platform and were intercepted at the border.
- Continuing to cooperate with the Immigration Department and the Ministry of Labor to strengthen publicity so that foreign workers and brides could meet the requirements.
- Strengthening cross-organization cooperation with Customs, Customs brokers, express parcel delivery enterprise, e-commerce platform servers and Post offices, dispatching quarantine detector dogs to assist in detection, and continuing to strengthen inspections.

Thank you for your attention !

Procedures for the importation of plants and plant products by postal mail (English version)

https://www.baphiq.gov.tw/ws.php?id=18871

Phytosanitary requirements for the entry of used products that may carry Brown Marmorated Stink Bug (BMSB)

SAG
Ministerio de Agricultura

Gobierno de Chile

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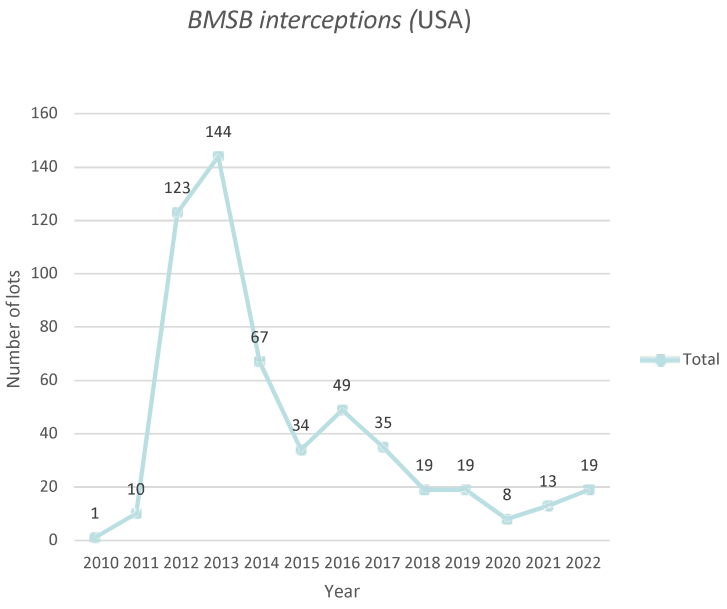
Agricultural Protection Division - Forestry & Seeds
Agricultural and Livestock Service | Government of Chile

PROVISIONAL EMERGENCY PHYTOSANITARY MEASURES



Given that in 2012 the Chilean Agriculture and Livestock Service (SAG) began to intercept Brown Marmorated Stink Bug (BMSB) in used products from the United States of America, and considering that it is a quarantine pest for Chile, SAG established provisional emergency phytosanitary measures for the control of the pest.

Subsequently, the provisional and emergency nature of the regulation was changed, providing for the establishment of permanent requirements.

SCOPE OF THE REGULATION

- Consignments of used clothing, used footwear, used toys, used vehicles (including pieces of used vehicles) coming from the United States of America that are imported into Chile, and products entering in transit through the national territory that require a change of means of transportation, **must undergo phytosanitary treatment in the country of origin.**

- Used vehicles entering Chile with temporary admission for special purposes of exhibition, competition, recreation or for private purposes, and used vehicles from the United States of America, which are imported from a third country and which remain for a minimum period of 6 months in that country, before entering Chile, **shall only be subject to a phytosanitary inspection at the point of entry.**

PERMANENT PHYTOSANITARY MEASURES

- Phytosanitary treatments must be carried out by USDA/APHIS-approved firms or by firms approved by federal or state pesticide treatment agencies, as evidenced by registration on an official list of USDA/APHIS-approved firms or by the respective federal or state agency, **which must be verified by the SAG prior.**

- The company must certify that the treatment has been carried out by issuing a treatment certificate.

PHYTOSANITARY TREATMENTS

The phytosanitary treatments authorised in the regulation are as follows:

- Application of **pyrethroid insecticides**, complying with the dosage and concentration recommended on the pesticide label. This treatment is authorised only for used vehicles and pieces of used vehicles.

- Fumigation with **methyl bromide, phosphine and sulfuryl fluoride.** These treatments are authorised for all used products. It is the responsibility of the treatment company and the exporter to verify the feasibility of applying them without damaging the product.

- **Heat treatment**, until a room temperature of at least 50°C is reached for a minimum period of 20 minutes. This treatment can be applied to all used products.

REQUIREMENTS VERIFICATION

- The products are subject to a **phytosanitary inspection upon arrival in Chile**, at the authorised point of entry, in enclosures considered as primary zone or in any enclosure specifically authorised for this purpose, in accordance with the requirements defined by SAG.

- Failure to comply with the requirements established in Resolution N°971/2028 and its amendments, **will imply the adoption of phytosanitary measures by SAG.** All at the expense of the importer.

CRITERIA FOR APPROVAL AND REJECTION

- Products arriving in the country with a fraudulent treatment certificate **will be rejected.**

- For products arriving in the country without treatment or for products treated by companies that are not authorised by USDA/APHIS or by the competent federal or state agency, SAG may authorise treatment through the issuance of a **Case-by-Case Exempt Resolution.**

- SAG will authorise the application of the treatment if the merchandise is stored in safe conditions to avoid the risk of pest spread, the packaging material allows for treatment actions, and the point of entry has the necessary infrastructure and equipment to carry out phytosanitary treatments.

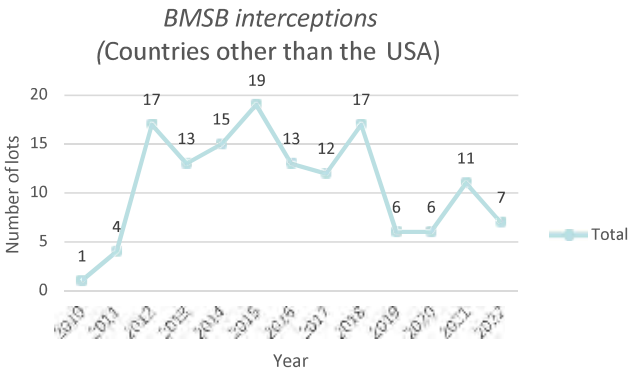
CRITERIA FOR APPROVAL AND REJECTION

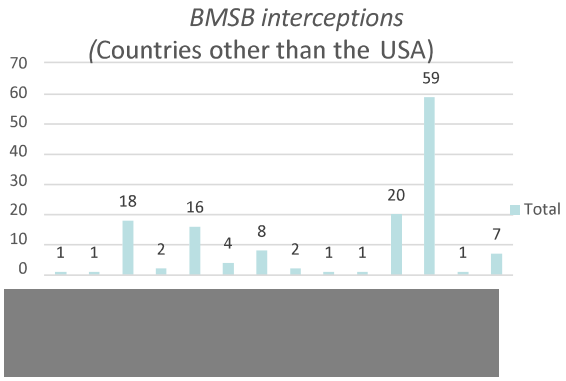
- Treatments must be carried out by SAG or by companies authorised by the SAG, complying with the procedures established in the regulations in force and delivering a treatment certificate at the end of the treatment.

- Treated products will be subject to a new phytosanitary inspection.

- The consignment shall be rejected if it is impossible to apply phytosanitary treatment in Chile or if the importer refuses to carry out the treatment. In such cases, the product must be returned to the country of origin or redirected to another market, in compliance with the deadlines set by the SAG.

PEST INTERCEPTION IN OTHER COMMODITIES AND ORIGINS





Upon interception of Brown Marmorated Stink Bug (BMSB) from commodities and from origins other that the United States of America, the phytosanitary measures established in the regulation are applicable, if feasible to apply, or such other measures determined by SAG.

Thank you.

SAG
Ministerio de Agricultura
Gobierno de Chile

Australian Government
Department of Agriculture, Water and the Environment

Methyl Bromide Methodology Review

2022 Quarantine Regulators Meeting

按 Ctrl+Shift+M 鍵，以將您的麥克風取消靜音。

May 2022

Context: What is Methyl Bromide Methodology?

- Sets out the minimum requirements for treatment providers performing methyl bromide fumigations on commodities and/or associated packaging suited to such treatments for Quarantine and Pre-shipment (QPS) purposes.
- Basis for compliance auditing of treatment providers to monitor their performance of effective QPS treatments with methyl bromide.
- Applies to commercial and government treatment providers performing QPS methyl bromide fumigation treatments for countries that have adopted a specific methyl bromide treatment schedule.

Methyl Bromide Methodology Review – Why the Changes?

Changes based on past feedback and levels of compliance

- For enforceability – remove ambiguity and simplify language
- Clear articulation of requirements and how this applies to fumigation scenarios
- Improve usability by providing context/removing assumed knowledge

Methyl Bromide Methodology Changes

Old Version	New Version
More words and longer sentences	Shorter, simpler sentences
Ambiguous language and terms	Clear and direct language and terms
Directions based on assumed knowledge	More explanation and context provided

Methyl Bromide Methodology Review Changes – Example #1

More words and longer sentences → Simple, shorter and clearer sentences

2.3 Personal protective equipment (PPE)

2.3.1 Suitable respiratory protection must be worn at all times inside the risk area while it is in force.

2.3.2 Respiratory protection must be worn at all times when inside the buffer zone during ventilation. See 9 Ventilating the enclosure.

→

2.3 Personal protective equipment (PPE)

2.3.1 Respiratory protection equipment must be worn at all times when inside the exclusion zone (see section 6.1), including during ventilation (see section 9).

9.2.2 An assessment of the risks must be done to manage the ventilation process so that unprotected personnel in the vicinity are not exposed to unsafe levels of fumigant. The assessment must take into account:

→ 10.2.2 A risk assessment must be done to manage the ventilation process and ensure it is safe by considering:

Methyl Bromide Methodology Review Changes – Example #2

Ambiguous language/terms → Clear and direct language/terms

2.1.2 **Appropriate** control measures must be in place to address the hazards identified.

→ 2.2.1 Before commencing fumigation, a risk assessment must be carried out to ensure **safety measures** are in place to minimise the risk of methyl bromide exposure to:

How to use this document

Some of the requirements in this methodology only apply in certain circumstances, generally related to the type of enclosure used or fumigating perishables. It is important for the fumigators and compliance auditors to understand the purpose of the requirements and the outcomes they are intended to achieve and the particular circumstances in which they apply.

This document should be read in conjunction with the *Guide to performing QPS fumigations with methyl bromide*, which provides information on how to meet these requirements in commonly encountered situations.

→

How to use this document

Treatment providers and compliance auditors must understand the purpose of the requirements of this methodology, the outcomes they are intended to achieve and the particular circumstances in which they apply.

The *Guide to performing QPS fumigations with methyl bromide* provides background information that may assist in meeting these requirements in commonly encountered situations.

The technical terms used in this methodology are defined in the glossary at the back of the document. For all terms not defined in the glossary, refer to the definition used by the Macquarie Dictionary.

Methyl Bromide Methodology Review Changes – Example #3

Enhanced Clarity in Explanations

- Breaking down information for clearer, more detailed explanations

What now?

Internal Part 1:	External Part 2:	External Part 3:
✓ Department of Agriculture, Water and the Environment (DAWE) ✓ International Cargo Cooperative Biosecurity Arrangement (ICCBA)	❑ Australian Fumigation Accreditation Scheme(AFAS) partners ❑ ICCBA partners ❑ Australian State and Territory Regulators	❑ Australian Industry ❑ International Industry

Next Steps:

1. Collate and Review Feedback

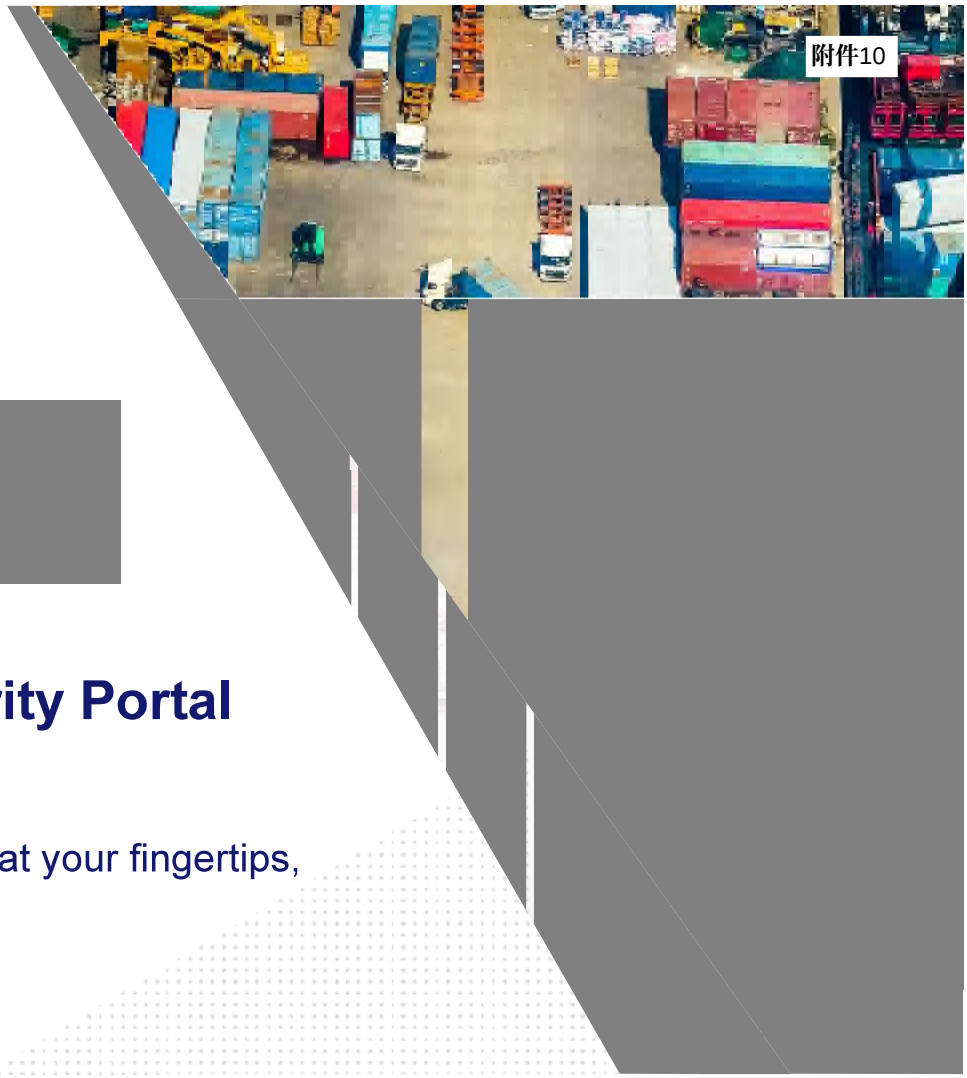
2. Arrange consultation meetings with partners to discuss significant concerns

3. Final consultation

DAWE to coordinate consultation with domestic industry partners

AFAS/ICCBA to coordinate consultation with international industry partners

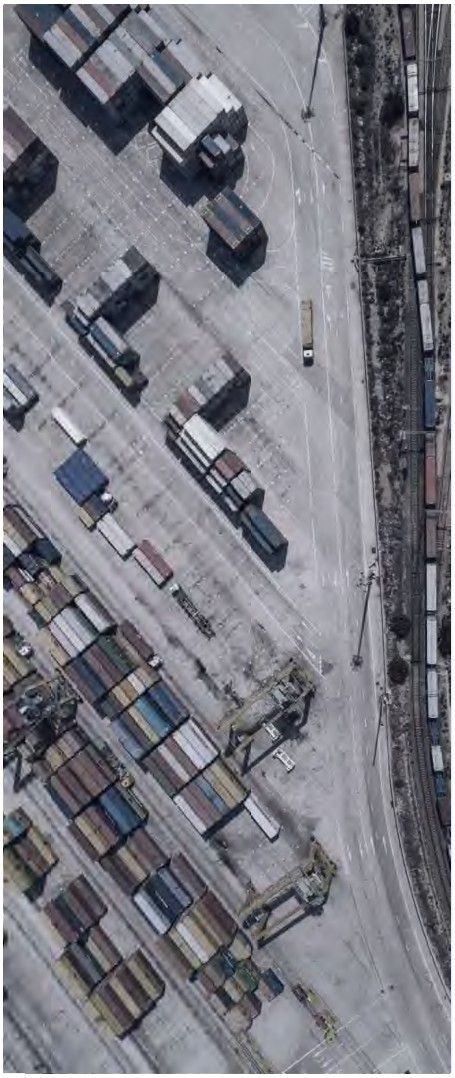
Questions?



Depart

The Biosecurity Portal

Import Inspections at your fingertips, online 24/7



Background

The Client and Workload Management (CWLM) project aims to:

- deliver an enterprise wide client and workload management capability
- supports a cost effective, modern and client focused service delivery model and
- allows workload management to be managed at a national level in order to optimise resource usage.

Comprises of:

✓ Scheduling and Workload Management System (SWMS)

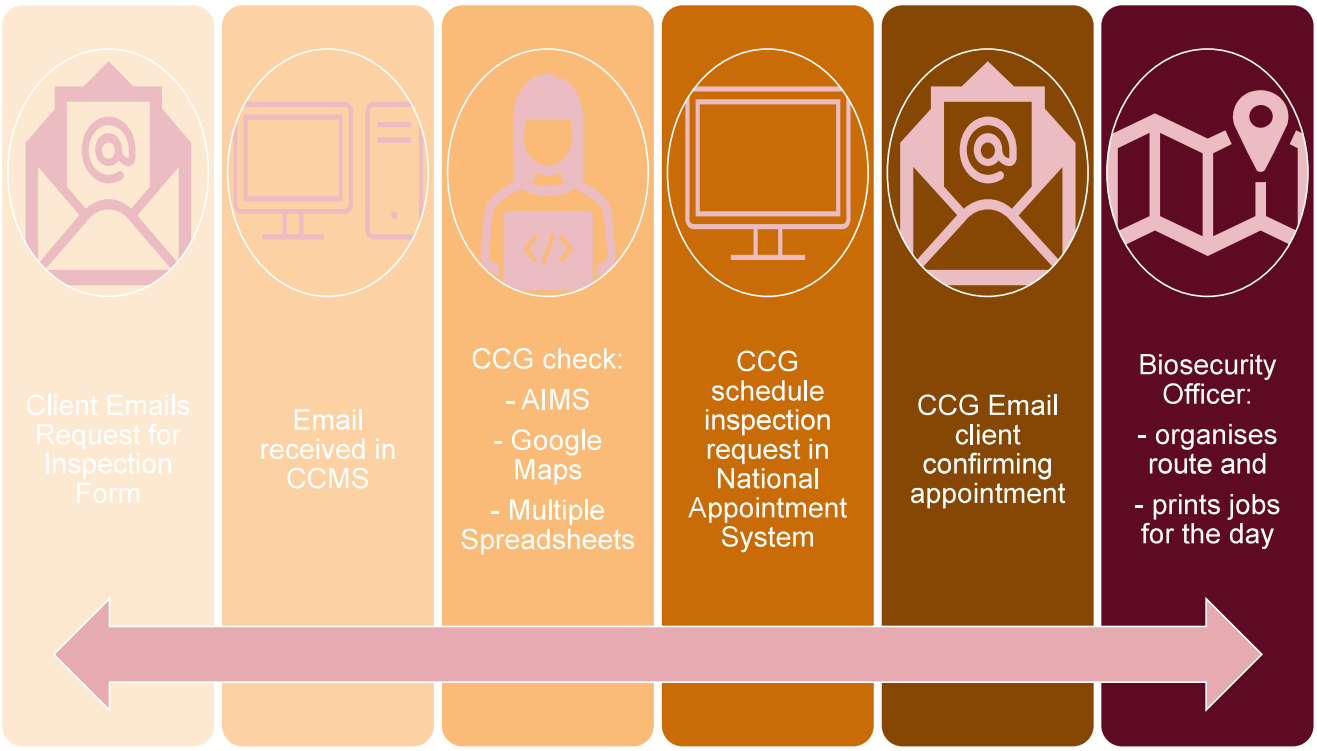
✓ Field Service Mobile App

✓ Biosecurity Portal

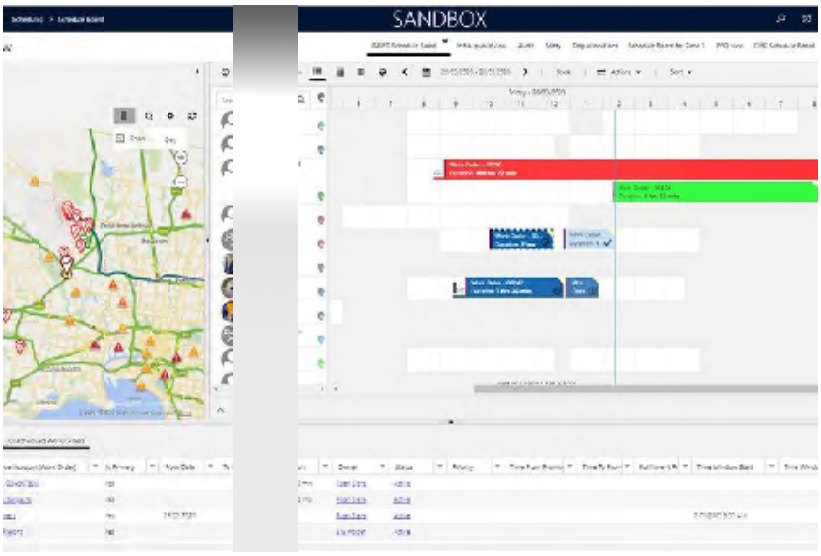
Project Impact/Reach

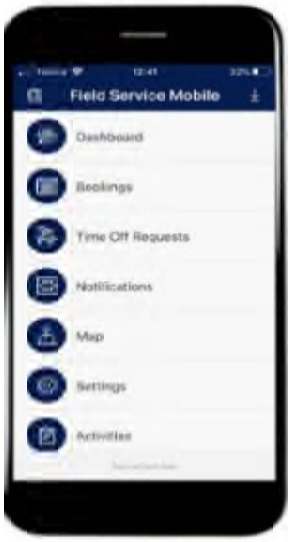
- 3,000 Clients (Importers, Brokers, Approved Arrangements. Freight Forwarders)
- 130,000 import inspection bookings pa
- 80 Client Contact Group Staff, nationally
- 1,200 Biosecurity Officers, nationally
- 200 team leaders/managers, nationally

Current Process



SWMS & FSM App

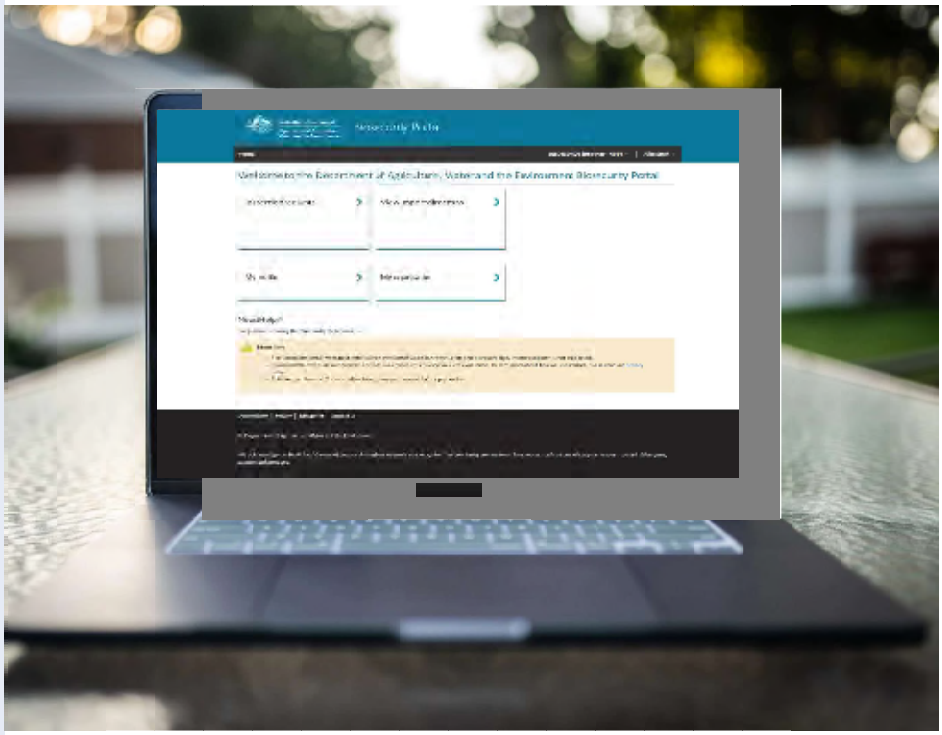


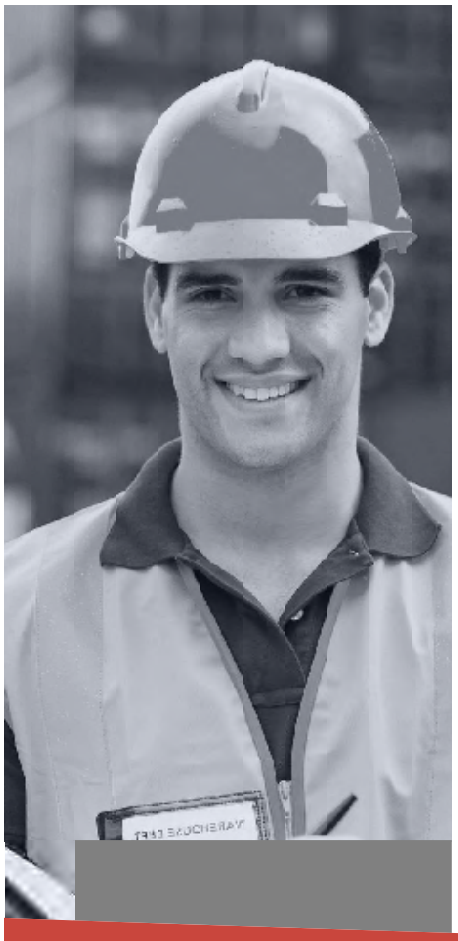


- ✓ Staggered deployment – 2021/2022
- ✓ Introduced a Workforce Management Function

Book online – All your bookings in one place

The new Biosecurity Portal now allows organisations to **book, view** and **manage** *import* inspections **at any time** from a centralised, online location.





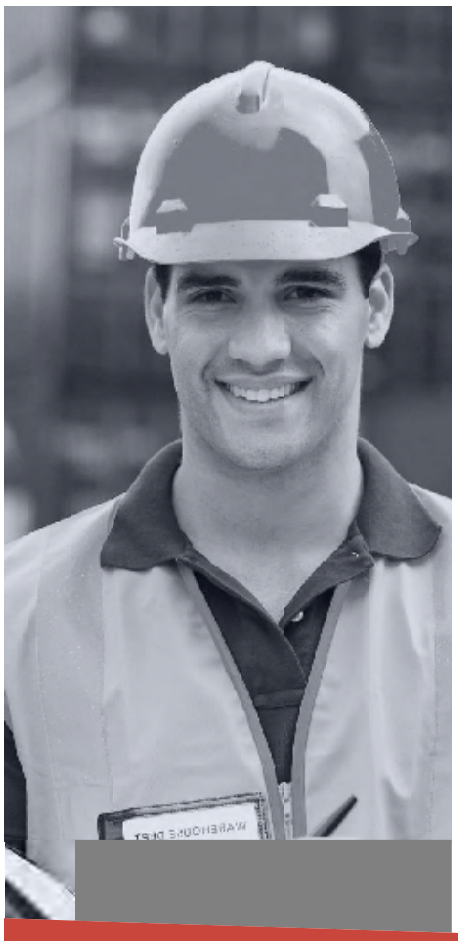
What can the Portal do?

An online Portal to allow organisations to book a biosecurity import inspection online at anytime.

What's new?

- Request to book, view and manage biosecurity **import** inspections through an online booking platform.
- Personal accounts that are linked to all the organisation's bookings.
- View all **import** bookings in a single, easy to use place.
- View and Print AIMS Direction information.
- Receive live updates on the status of your request/booking changes.

Biosecurity Portal
Inspections at your fingertips



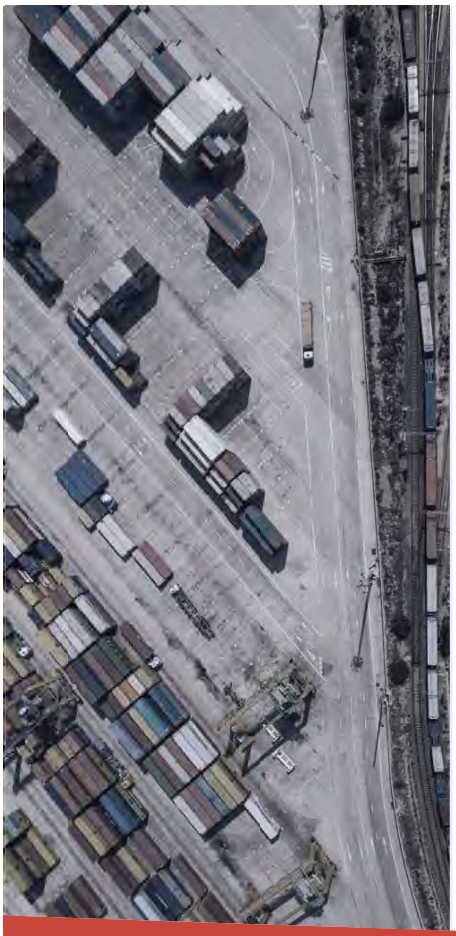
Industry Benefits

An online Portal to allow organisations to book a biosecurity inspection online at anytime. Makes booking inspections simpler, faster and clearer.

What's new?

- **Time saving**: All inspection information is done through the Portal, no need for emails, attaching forms, or file management
    - Book, and cancel biosecurity inspections through an online booking platform
- Personal accounts that are linked to all organisation's bookings
- **A single location:** View all your bookings in a single, easy to use place
- **Live updates:** Receive live updates as the status of booking changes

Biosecurity Portal
Facilitating Seamless Imports



Benefits for the Department

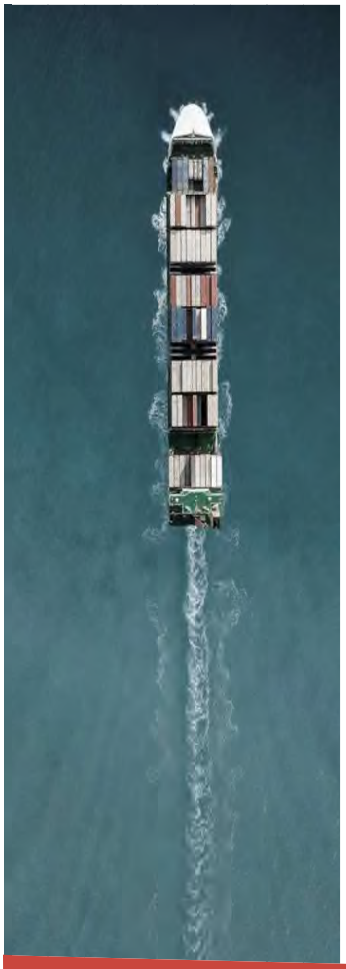
- Removes the need to manage emails and attachments
- Streamlined booking process – portal will create the case and populate answers in SWMS
- Simplifying data entry for booking officers
- Better view of our clients
- Authenticated interactions
- Digitising biosecurity services

Progressive rollout across all States

The Portal is live in NSW, ACT, WA, Qld, NT and SA for **import** inspection bookings in those states.

- Anyone can book from anywhere in Australia, but the request must be for an **import** inspection at a site in one of those states.

VIC will be live from 20 July.



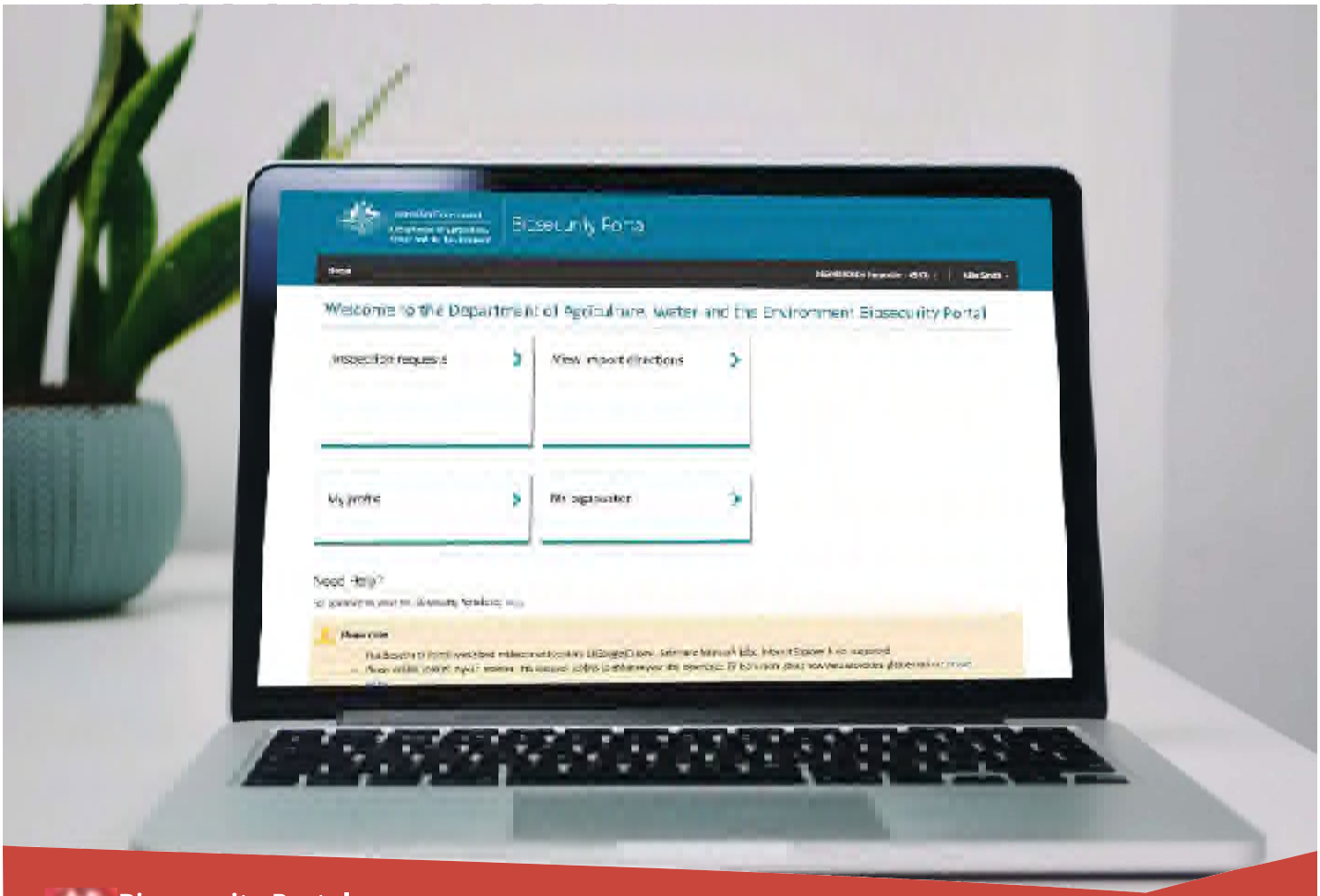
Next Steps

System Development:

- Continues with ongoing enhancements –
  - additional self-service functionality
  - streamlining manual processes/ automation of scheduling
  - enhancements – based on user feedback
  - interface with existing industry software

Process Changes:

- Channel migration



DAWE Profiling

current capability and future uplift

May 2022

Jon Webber
a/g Director, Profiling and Targeting Section

Australian Government
Department of Agriculture, Water and the Environment

About

PaTS

The Profiling and Targeting Section (PaTS):

- Profile governance owners across cargo, traveller and mail pathways
- Deploy control testing to validate regulatory control effectiveness
- Support tactical targeting to discover and disrupt high-harm threat
- Administer the Cargo Compliance Verification program

What is mail and traveller profiling

capability?

- Mail
  - ✓ restricted capability based on the restricted article level detail
  - ✓ based on limited data parameters
  - ✓ Intervention based on postal system controls
  - ✓ limited ability to go beyond country of origin

- Traveller
  - ✓ statistical methodology based on various factors and deployed against 'cohorts' of travellers
  - ✓ Specific schemes managed for non-compliant travellers, frequent travellers and crew
  - ✓ COVID impacts yet to be told

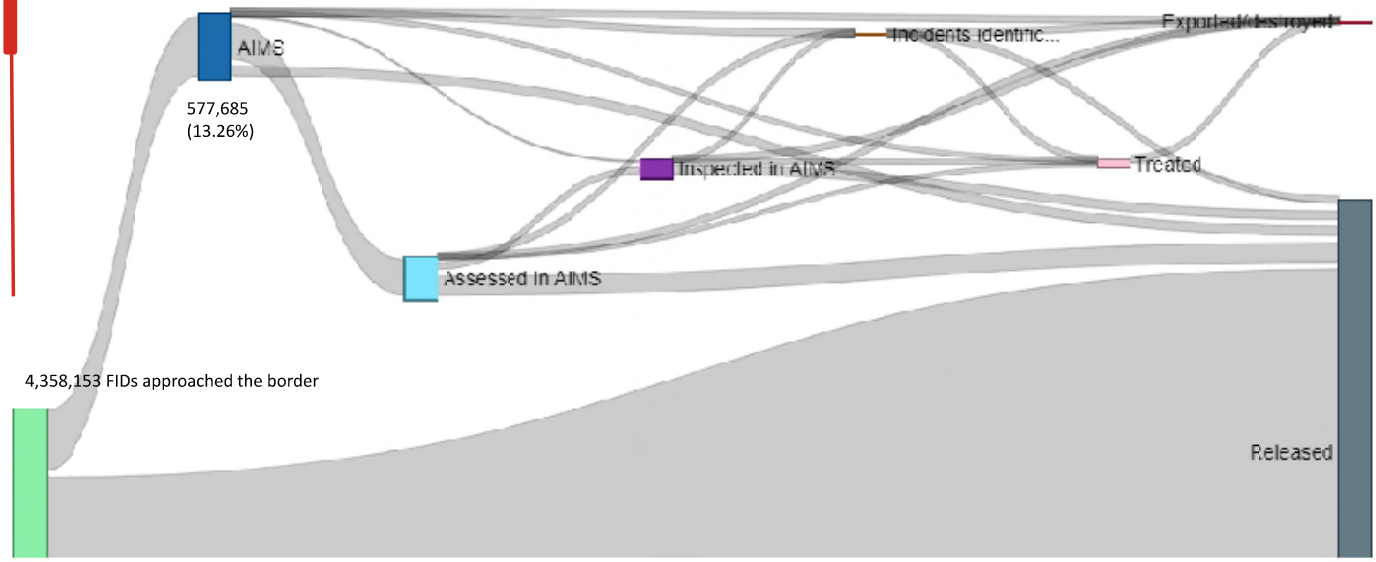
What is Cargo Profiling

capability?

- 5800 Cargo Profiles – biosecurity, illegal logging, imported foods
- Types of profiles – compliantly reported commodity profiles (98%) and response/entity profiling (2%)
- Cargo profiling is the essential link between import conditions and getting consignments in front of officers for assessment
- Support for control tests and targeting and ad-hoc support across environment, fisheries and export domains

Cargo Profiling,

what it looks like



DAWE Profiling

capability uplift

- Why?
  - ✓ increasing trade
  - ✓ Increasing complexity of supply chains
  - ✓ efficient and effective resource utilisation
  - ✓ government commitments

- What?
  - ✓ improved data holdings and analytical tools
  - ✓ IT infrastructure development
  - ✓ systems ownership

Profiling capability uplift

machine learning – SAC (live)

- currently deployed machine learning capability for non-commercial cargo
- provides recommendation of required 'at-border' action for non-commercial cargo
- requires manual (human) validation
- currently deployed to a subset of our profile (approx. 60 profiles that account for about 40% of match volume)
- evolving process of maturing and refining the capability, both technically and to ensure appropriate human interaction
- Expected iterative release phases to realise full potential

Profiling capability uplift

machine learning – FID (emerging)

- Proof of concept ran in 2019 to test ability for machine learning algorithms performance in accurately predicting risk
- Trained on historical data and tested against live inspections.
- Phase 2 validation nearing completion and design and architecture discussions underway.
- Options for implementation/deployment
- Strong governance and management
- Significant shift in risk management approach

Profiling capability uplift

mail Electronic Advance Data

- EAD is the info from the customs declarations that people fill out when posting internationally. We now receive this data in near real-time.
- The data tells us more about mail than ever before, and it may allow us to predict non-compliance in the future.
- Successful small-scale trials mimicking cargo profiling
- Second stage trial to look at entities
- Future use case and capacity

Cargo Profiling

Questions

附件12

Australian Government
Department of Agriculture, Water and the Environment

Australia's experience in developing treatment methodologies

2022 Quarantine Regulators Meeting

May 2022

Biosecurity Treatments

Why do we care about effective biosecurity treatments?	
Biosecurity treatments underpin international trade	Ineffective treatments risk introducing biosecurity pests and losing market access

Regulatory Framework

Scheme/arrangement	Treatment schedule	Treatment methodology
Sets out the requirements for the company to participate in the system and remain acceptable.	**Sets out the treatment rate for the specific commodity and pathway.**	**Sets out the baseline requirements for the effective application of the treatment.**
Example: treatment providers must be audited once every 12 months.	**Example: Timber packaging needs to be treated with MB at 48g/m³ for 24 hours at 21 °C or above.**	**Example: gas concentration readings are required to be taken at the start and at the end of the fumigation.**

Treatment Methodology

Why do we establish treatment methodologies?

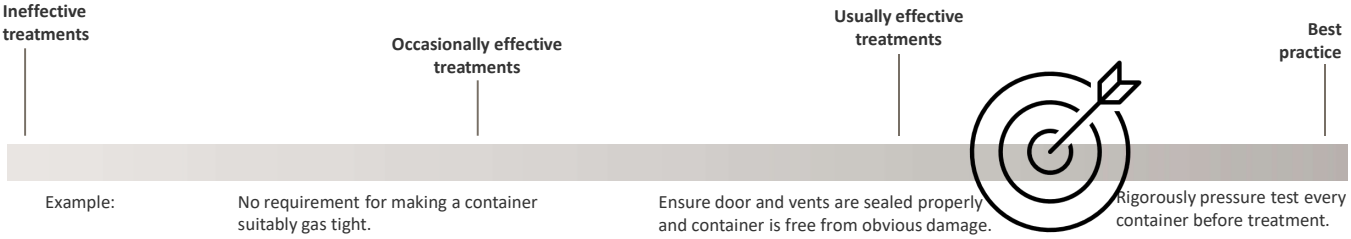
- Ensure treatment providers understand the requirements to conduct an effective treatment
- Ensure treatments can be verified as being conducted effectively
- Ensure only the minimum necessary amount of regulatory burden
- New – promote treatment provider compliance
- Ensure treatments are conducted safely?

Given the purpose, what are the principles for writing a methodology?

The requirements must:

- Deliver an effective treatment if followed
- Be verifiable
- Be easy to understand
- Be enforceable
- Balance regulatory burden against assurance

Treatment Effectiveness Spectrum



Example:

No requirement for making a container suitably gas tight.

- Less burden and easier to comply.
- Can lead to regular treatment failures.
- Can perversely incentivise deliberate non-compliance.

Ensure door and vents are sealed properly and container is free from obvious damage.

Rigorously pressure test every container before treatment.

- Less treatment failures.
- Cost of compliance is high.
- Can perversely incentivise deliberate non-compliance.

When to Develop a Treatment Methodology

When a treatment is complex enough to need application requirements, and;

1) Consistent issues are identified with the application of a previously accepted treatment

or

2) A new treatment is approved that requires a methodology

Industry request

- More cost and time effective options
- New proprietary technique or formulation
- More environmentally friendly alternatives

Government led

- New pests or pathways
- Alternatives with better efficacy
- Pests build up resistance to existing options

Prior to Developing a Treatment Methodology

Understand the treatment

- Identify the treatment type and any similarities to existing treatments
- Is there a manufacturer for the treatment? Eg a chemical manufacturer for a fumigant
- Is the treatment a bespoke process? Eg not intended for wide use
- What does the treatment process involve? Is it mobile, fixed, in transit, etc?

Identify industry or academic experts.

Ultimately need to identify the critical treatment parameters:

Methyl Bromide	Heat	Insecticide	Controlled atmosphere
• **Concentration** • **Time** • **Temperature**	• **Temperature** • **Time**	• **Concentration** • **Spray** • **Pattern/coverage**	• **Concentration** • **Time** • **Temperature** • **Pressure**

Australia's Steps for Developing a Treatment Methodology

Draft high level requirements – work with industry experts where possible

- Consult internal experts and stakeholders
- Consult targeted industry stakeholders

Prepare 'consultation draft' methodology

- Wide public consultation
- Information sessions

Implement, review and refine

- Ongoing, not 'set and forget'

"Don't let the perfect be the enemy of the good."

Australian Government
Department of Agriculture, Water and the Environment

Questions?

2022 Quarantine Regulators Meeting

May 2022

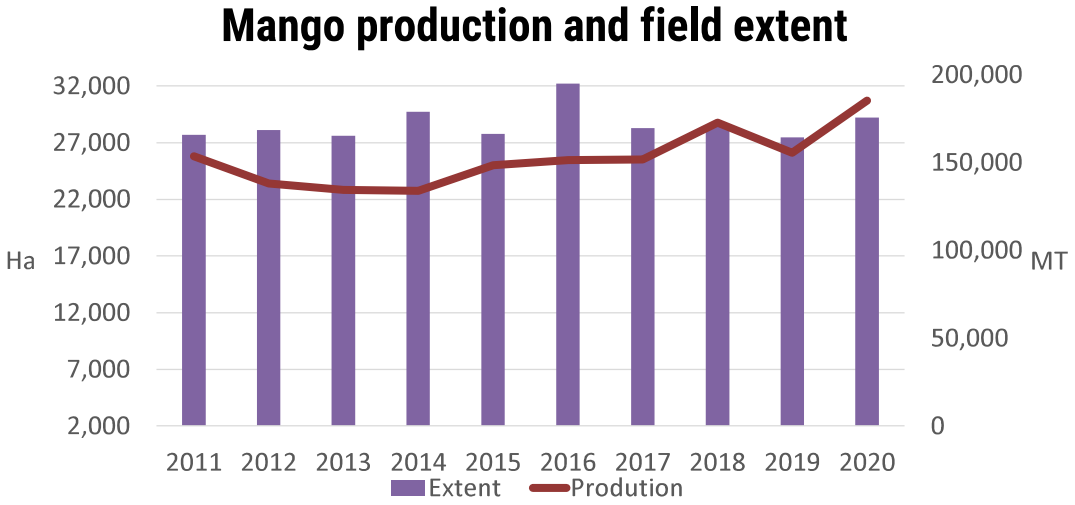
Overview of Vapour Heat Treatment for Fresh Fruits in Sri Lanka

Thushara Wickramaarachchi
Head of NPPO / IPPC Official Contact Point
National Plant Quarantine Service (NPQS)
Katunayake, Sri Lanka

Content

- Introduction
- Fruit fly diversity and host plant in Sri Lanka
- Phytosanitary certification procedure for fruits and vegetable against fruit fly species
- Fruit fly studies and VHT standards on Mango in Sri Lanka

Introduction



- There is a high demand for the Sri Lankan high quality export potential mango fruits from the high-end markets such as Japan, Korea and China
- However, due to the fruit fly infestation of local fruits, it needs to apply plant quarantine treatment for the mangoes in order to comply with export phytosanitory conditions

Diversity of fruit flies in Sri Lanka

- 16 fruit fly species were identified with 45 species of host plants (Tsuruta *et al.*, 1997)
- 39 fruit fly species have been reported (Leblanc *et al.*, 2018)
  - 12 fruit fly species have been reported to damage to fruits of many agricultural crops throughout the country

Fruit fly species damage to fruit and vegetable and their host plants in Sri Lanka

Fruit fly species	Host plants
Bactrocera dorsalis	**Mango**, Cashew, Avacado etc.
Bactrocera kandiensis	**Mango**, Cashew, Guava, Papaya etc
Bactrocera correcta	Guava, **Mango**, Soursop , etc.
Bactrocera latifrons	Yellow-fruit nightshade
Bactrocera nigrotibialis	Indian Almond
Bactrocera versicolor	Sapodilla
Bactrocera zonata	Wild guava, Indian almond etc.
Dacus ciliatus	Cucurbit fruit pest
Zeugodacus caudatus	Cucurbit flower pest
Zeugodacus cucurbitae	Cucurbit flower pest
Zeugodacus. diversus	Cucurbit flower pest
Zeugodacus tau	Cucurbit flower pest

Process Map for Exportation of Sri Lankan Mango with VHT Treatment

Fruit fly infestation is the major barrier for the exportation of local mango. Therefore, farmers should adhere to the supply chain introduced by the NPQS

1. Establishment of commercial mango orchards
2. Registration of export oriented mango orchards
3. Field certification for export
4. Pack house inspection procedure
5. VHT Treatment
6. Exit point inspection and exportation

Phytosanitory treatment could only be applied for the fruits produced from NPQS certified fields

Vapour Heat Treatment (VHT) studies carried out in Sri Lanka

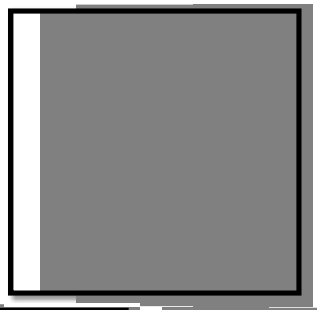
Vapor Heat Treatment against four species of fruit flies in mango (Var. “Karthakolomban”)

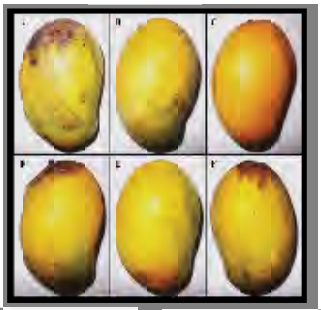


Target insects

Bactrocera dorsalis	*Bactrocera correcta*
	
Zeugodacus tau	***Zeugodacus cucurbitae***
	

Target fruit





Mango ‘Karthakolomban’ fruits (*Mangifera indica*)

Mango ‘Karthakolomban’ orchard

Mango ‘Karthakolomban’ flower

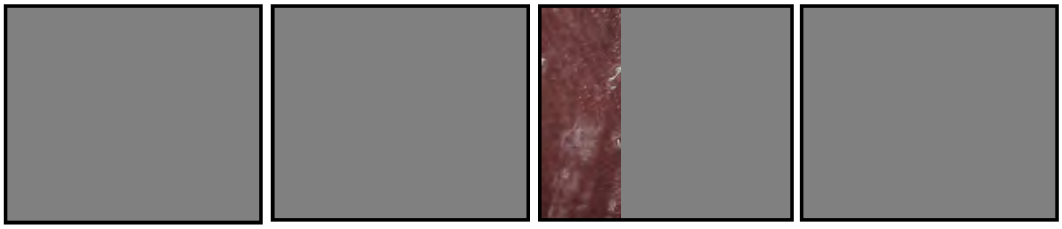
Mango ‘Karthakolomban’ fruits on the tree

Mortality Test of Fruit Fly

1. Hot Water ImmersionTest	To determine the most heat tolerant species of fruit fly
2. Susceptibility Mortality Test by VHT	To determine the most heat tolerant species & life stage of fruit fly
3. Small-Scale Mortality Test by VHT	To Determine VHT standards (Fruit core temp. and Holding time)
4. Large-Scale Mortality Test by VHT	To confirm VHT standards (100% mortality with more than 30,000 effective insects)

Mass rearing of fruit fly

- Maintenance 4:1 (Female :male) sex ratio in the test population
- Collect eggs using an egging device
- All adults and subsequent larval stages are reared separately and fed with relevant artificial diet



Artificial Adult diet | Egging device | Eggs | Artificial larval diet

Hot water immersion test

- **Purpose**
  To determine the most heat tolerant species of fruit flies for heat generated by ***Hot water immersion***

- **Materials**

  Test insect : ***B. dorsalis , B. kandiensis, B. cucurbitae and B. tau***
  Target stage : Eggs (mature), larvae (1st, 2nd , 3rd instar)

- **Methods**
  - ✓ Insects was immersed in hot water
  - ✓ Temperature : 45.0 °C
  - ✓ Exposure time : 4, 7, 10, 13, 16, 19, 22, 25, 28 & 31 min

Result of hot water immersion test

Corrected mortality of each developmental stage of *B. dorsalis, B. kandiensis, B. cucurbitae* and *B. tau* in hot water immersion test

Exposure time (min)	Mortality (%)															
	B. *dorsalis*				B. *kandiensis*				B. *cucubitae*				B. *tau*			
Stage	ME	1st	2nd	3rd	ME	1st	2nd	3rd	ME	1st	2nd	3rd	ME	1st	2nd	3rd
4	11.51	0	0	11.36	24.83	8.39	33	12.5	9.3	25.17	0	22.93	47.73	24.68	27.41	6.72
7	25	35.24	10.85	22.73	51.34	12.77	24.5	31.5	28.86	39.86	30.59	57.52	45.62	32.82	70.72	61.56
10	20.63	31.28	40.57	39.55	51.34	16.42	83.5	78	42.02	48.6	65.75	80.45	49.85	56.74	92.21	97.31
13	40.87	30.4	47.64	78.18	45.68	32.48	71	79.5	45.02	68.88	77.17	95.86	49.24	77.35	94.08	100
16	50.4	47.58	76.42	81.36	57.05	45.62	89.5	89.5	50.25	82.17	88.58	96.99	58.61	96.69	98.75	99.73
19	55.56	36.12	81.6	83.18	58.39	63.14	94.5	97.5	51.74	88.11	87.21	98.87	62.84	99.24	99.69	100
22	66.27	56.39	89.15	92.73	63.31	80.66	97	99.5	56.47	86.01	91.32	99.25	75.53	100	100	100
25	63.89	61.23	97.17	94.09	60.43	75.55	100	99.5	67.66	95.8	98.17	100	89.73	100	100	100
28	63.49	87.67	98.58	99.55	73.74	82.48	100	99	81.09	96.15	99.54	100	93.96	100	100	100
31	62.7	92.51	100	98.64	80.94	93.07	100	99	87.81	97.2	99.54	100	98.49	100	100	100

B. dorsalis has shown the highest heat tolerance at the hot water immersion test

Susceptibility mortality test by VHT

■ **Purpose:**

To determine the most heat tolerant stage of fruit fly against high temperature

■ **Materials**

Test insect : ***B. dorsalis , B. kandiensis, B. cucurbitae and B. tau***

Target stage : **Mature eggs , Larvae (1st, 2nd , 3rd instar)**

Mango Size : **250-300 g**

■ **Methods**

- Artificially infested mango was treated in vapor heat treatment (VHT)
- Fruit core temperature : 41, 43, 44, 45, 46, 47°C and Control

Result of susceptibility mortality test

Corrected mortality of each developmental stages of B. *dorsalis*, B. *kandiensis*, B. *cucurbitae* and B. *tau* in heat susceptibility test by VHT method

Temperature	Mortality (%)															
	B. dorsalis				B. kandiensis				B. cucubitae				B. tau			
	ME	1st	2nd	3rd	ME	1st	2nd	3rd	ME	1st	2nd	3rd	ME	1st	2nd	3rd
41	4.30	37.21	6.23	20.89	37.26	43.44	0.58	17.28	79.87	19.83	4.61	4.44	47.13	0	40.46	33.16
43	13.58	45.64	9.76	0	32.8	45.48	8.65	48.73	78.22	33.52	29.28	38.41	41.08	13.81	45.72	63.73
44	44.37	57.56	0	41.23	51.91	47.23	10.95	71.39	87.46	42.74	38.16	90.77	47.45	54.7	80.59	99.22
45	21.85	65.99	43.63	65.18	64.97	81.05	36.89	80.45	100	99.44	83.55	100	96.63	96.96	99.67	100
46	54.64	93.9	73.44	89.03	76.11	88.63	92.22	100	100	100	100	100	100	100	100	100
47	99.57	97.67	96.21	100	100	100	100	100	100	100	100	100	100	100	100	100

Eggs, 1st and 2nd instar of B. dorsalis has shown the highest heat tolerance at the Vapour Heat Treatment

Small scale mortality test by VHT

- **Purpose:**

To Determine VHT standards (fruit core temperature and holding time)

- **Materials**

Test Insect : ***B. dorsalis***
Target stage : **Mature eggs, *1st and 2nd instar***
Mango size : **250-300 g**

- **Treatment Conditions**

Temperature (^{0}C)	Time (min)
46.0	2
46.5	0
46.5	10
46.5	20
47.0	0
47.0	10

Results of small scale mortality test by VHT

Corrected mortality of each developmental stages of B. *dorsalis* in heat susceptibility test by VHT method

Stages	Mortality (%)						
	Temperature (Time)						Control
	46.0 (2 min)	46.5 (0)	46.5 (10)	46.5 (20)	47.0 (0)	47.0 (10)	
Egg	50.44%	81.44%	100%	100%	100%	100%	47.58%
1st	81.39%	100%	100%	100%	100%	100%	85.00%
2nd	85.58%	100%	100%	100%	100%	100%	88.27%

The Study showed that 46.5^0- 10 min, 46.5^0- 20 min, 47.0^0- 0 min & 47.0^0- 10 min effective to eradicate eggs, 1st Instar and 2nd Instar of fruit fly

Fruit injury test

09 fruit quality parameters were tested with different temperature and time combinations

Parameter
Weight loss
Ripeness at survey
pH
Brix
Taste & flavor
Shrinkage
Cavity and spongy tissue in pulp
Fruit decay
Anthracnose

Treatment Conditions	
Temp. and Time Combination	**Maturity stage**
46.5 ^{0}C (20)	R, G
46.5 ^{0}C (30)	R, G
47.0 ^{0}C (08)	R, G
47.0 ^{0}C (10)	R, G
47.0 ^{0}C (20)	R, G
47.0 ^{0}C (30)	G
47.0 ^{0}C (60)	R, G
48.0 ^{0}C (00)	G

Fruit injury test

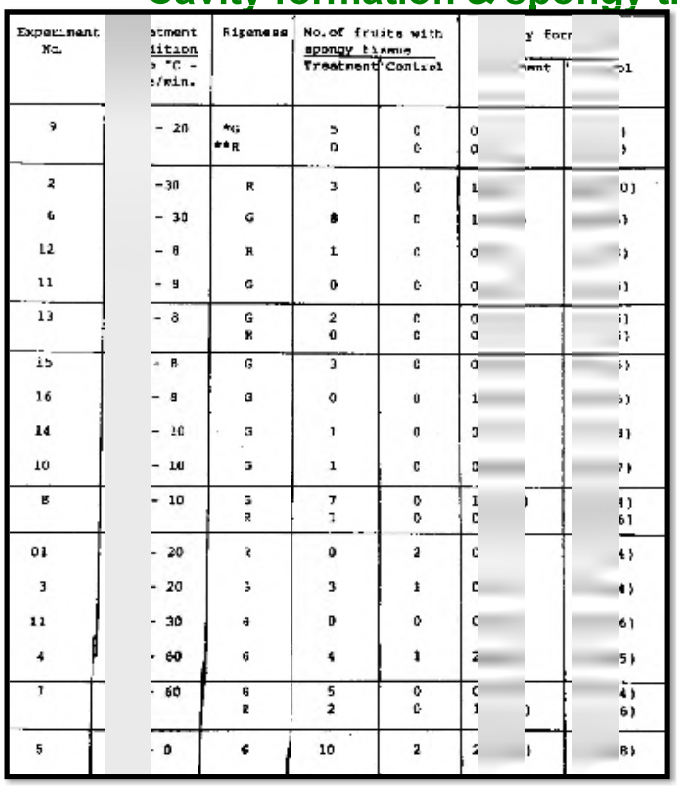
Test No.	Trea9tment Condition	Weight loss	Ripeness at survey	Fruit Rot	Shrinkage	Anthracnose	pH	Brix	Others
1	47.0 – 20	T:10.8% C:11.2% (T=C)	T:4.1% C:4.0% (T=C)	T:0.2 C:1.1 (T<C)	T:1.4 C:1.2 (T=C)	T:0.7 C:1.9 (T<C)	T:5.62 C:5.09 (T=C)	T:12.1 C:12.1 (T=C)	
2	46.5 - 30	T:11.9% C:11.0% (T=C)	T:3.9% C:4.3% (T=<C)	T:0.8 C:2.1 (T<C)	T:2.1 C:2.0% (T=C)	T:1.7 C:2.2 (T=<C)	T:6.0 C:6.23 (T=C)	T:11.0 C:13.2 (T=<C)	Taste & Flavor (T=C)
3	47.0 - 20	T:9.7% C:10.2% (T=C)	T:3.7% C:3.4% (T=C)	T:0.4 C:0.5 (T=C)	T:0.5 C:0.7 (T=<C)	T:0.3 C:1.1 (T<C)	T:4.68 C:4.78 (T=C)	T:8.7 C:9.2 (T=C)	Taste & Flavor (T=C)
4	47.0 - 60	T:14.0% C:13.8% (T=C)	T:4.1% C:4.2% (T=C)	T:1.1 C:1.3 (T<C)	T:1.1 C:1.3 (T=C)	T:0.4 C:1.4 (T<C)	T:4.53 C:4.91 (T=C)	T:7.6 C:8.4 (T=<C)	Taste & Flavor (T=C)
5	48.0 – 00	T:7.3% C:11.8% (Different conditions) (T<C)	T:2.9% C:3.3% (T=<C)	T:0.1 C:1.6 (T>=C)	T:0.1 C:1.6 (Different conditions)	T:0.1 C:0.5 (T<C)	T:4.65 C:4.82 (T>=C)	T:7.7 C:7.6 (T=C)	Taste & Flavor (T=C)
6	46.5 - 30	T:14.8% C:13.3% (T>=C)	T:3.9% C:3.8% (T=C)	T:2.3 C:2.3 (T<C)	T:2.3 C:2.3 (T=C)	T:0.4 C:0.9 (T<C)	T:4.41 C:4.49 (T=C)	T:10.0 C:10.4 (T=C)	Taste & Flavor (T=C)
7	47.0 - 60	G(10d):T=2.5 % C=3.2% R(5d):T=2.2% C=1.3% (T=C)	G(10d):T=2.7 C=2.7 R(5d):T=2.8 C=2.4 (T=C)	G(10d):T=0 .1 C:1.7 R(5d):T=0.6 C=0.4 (T=<C)	G(10d):T=0 C=0 R(5d):T=0.8 C=0.6 (T=C)	G(10d):T=0 C=0.7 R(5d):T=0.1 C=0.3 (T<C)	G(10d):T=4.14 C=4.67 R(5d):T=4.45 C=4.19 (T=<C)	G(10d):T=8.4 C=11.0 R(5d):T=9.0 C=11.0 (T=<C)	
8	47.0 - 10	G:T =2.6% C=3.2% R:T=1.5% C=1.3% (T=C)	G:T =2.4 C=2.7 R:T=2.7 C=2.4 (T=C)	G:T =3 C=1.7 R:T=3 C=0.4 (T<C)	G:T =0 C=0 R:T=1 C=0.6 (T=<C)	G:T =0 R:T=0.2 (T<C)	G:T =3.76 C;4.67 R:T=3.88 C;4.19 (T=C)	G:T =7.7 C:11.0 R:T=8.9 C:11.0 (T=<C)	

Test No.	Treatment Condition	Weight loss	Ripeness at survey	Fruit Rot	Shrinkage	Anthracnose	pH	Brix	Others
9	46.5 - 20	G:T =2.5% C=3.2% R:T=1.6% C=1.3% (T=C)	G:T =2.4 C=2.7 R:T=2.8 C=2.4 (T=C)	G:T =3 C=1.7 R:T=3 C=0.4 (T<C)	G:T =0.2 C=0 R:T=0.2 C=0.6 (T=C)	G:T =0.4 C=0.7 R:T=0.5 C=0.3 (T=<C) G>R	G:T =4.33 C:4.67 R:T=4.24 C:4.19 (T=C) G<R	G:T =11.2 C:11.0 R:T=9.5 C:11.0 (T=C)	
10	47.0 - 10	T:9.4% C:8.8% (T=C)	T:3.9% C:3.8% (T=C)	T:0.1 C:1.7 (T<C)	T:2.2 C:1.9 (T=C)	T:0.2 C:1.2 (T<C)	T:5.02 C:5.15 (T=C)	T:16.1 C:15.9 (T=C)	
11,12	47.0-8, 47.0 -30	47.0-8 T:10.1%, 10.9% 47-30 C:9.8%- (T=C)	47-8 T:4.0 47-30 C:3.8 (T=C)	47-8 T:0.3 47-30 C:1.1 (T<C)	47-8 T:1.6,1.5 47-30 C:1.0 (T>C)	47-8 T:0.4,0.2 47-30 C:0.4 (T=<C)	47-8 T:5.48,5.49 47-30 C:5.34 (T=C)	47-8 T:14.5,14.1 47-30 C:14.9 (T=C)	ST: 47-8 T=0 47-30 C:0
13	47.0 - 08	T:8.6% C:8.6% (T=C)	T:4.0 C:4.2 (T=C)	T:0.2 C:0.6 (T<C)	T:1.2 C:1.7 (T=<C) G=R	T:0.2 C:0.4 (T<C)	T:5.68 C:5.51 (T=C)	T:12.7 C:13.5 (T=C)	
14	47.0 - 08	T:G 9.1% R:9.1% C:G 9.8% R:8.4% (T=C)	T:G 3.8 R:4.2 C:G 4.0 R:8.4.2 (T=C)	T:G 0.2 R:0.2 C:G 0.9 R:1.2 (T<C)	T:G 0.9 R:1.3 C:G 1.6 R:1.4 (T=C)	T:G 0.1 R:0.1 C:G 0 R:1.2 (T<C)	T:G 5.38 R: 5.95 C:G 5.91 R:5.99 (T=C)	T:G 10.9 R:14.4 C:G 10.4 R:13.4 (T=C) G<R	Taste & Flavor (T=C)
15	47.0 - 10	T:7.9% C:7.0% (T>=C)	T:2.8 C;2.7 (T=C)	T:0 C:0.3 (T=<C)	T:0.1 C:0.1 (T=C)	T:0 C:0.1 (T=C)	T:4.49 C:4.93 (T<C)	T:12.9 C:13.6 (T=C)	
16	47.0 - 08	T:9.54% C:10.0% (T=C)	T:2.5 C:2.1% (T>=C)	T:0.4 C:1.9 (T<C)	T:1.8 C:1.5 (T=C)	T:0.2 C:0.5 (T=<C)	T:5.29 C:4.30 (T>C)	T:8.4 C:9.2 (T=<C)	
17	47.0 - 08	T:9.5% C:7.03% (T>C)	T:3.3 C:26 (T>C)	T:0.2 C:1.5 T=0.5 C=1.9 (T<C)	T:0.8 C:1 (T=C)	T:0.1 C:0.2 (T=<C)	T:4.76 C:3.93 (T>=C)	T:8.6 C:7.9 (T>=C)	

Summary of the results of fruit injury test

Parameter	Result
Weight loss	**No difference in weight loss** was observed in most cases
Ripeness at survey	**No difference in ripeness** was observed between treated and control mango
pH	**No difference in pH** was observed between treated and control mango
Brix	**No difference in Brix** was observed between treated and control mango
Taste & flavor	**No difference in taste and flavor** was observed between treated and control mango
Shrinkage	**Similar shrinkage of outer skin was observed** between treated and control mango
Fruit decay	**Fruit decay was reduced in treated mango** than control
Anthracnose	**Anthracnose was reduced/low in treated mango** than control

Cavity formation & spongy tissue formation in pulp



Experiment No.	Ripeness	No. of fruits with spongy tissue: Treatment	Control
9	*G **R	5 0	0 0
2	R	3	0
6	G	8	0
12	R	1	0
11	G	0	0
13	G R	2 0	0 0
15	G	3	0
16	G	0	0
14	G	1	0
10	G	1	0
8	G R	7 1	0 0
01	R	0	2
3	G	3	1
11	G	0	0
4	G	4	1
7	G R	5 2	0 0
5	G	10	2

- Spongy formation is increased with the exposure time more in green than ripen
  - ✓ 47^{0}C – 08, 10, 20, 30 & 60 min
- Irrespective of the ripeness, cavity formation of the following temperature-time combinations are very slight
  - ✓ 46.5^{0}C –20 & 30 min
  - ✓ 47^{0}C – 08, 10, 20, 30 & 60 min

It is concluded that ripen fruit stage is more suitable for the VHT treatment

Optimized Treatment Conditions of Fruit Injury Test

46.5^{0}C – 20 min
47.0^{0}C – 08 min
47.0^{0}C – 10 min
47.0^{0}C – 20 min

100% Mortality Achieved in Small-scale Mortality Test

46.5^{0}C – 10 min
46.5^{0}C – 20 min
47.0^{0}C – 00 min
47.0^{0}C – 10 min

47.0^{0}C – 08 min was selected for the Large Scale Mortality test

Large scale mortality test by VHT

- **Purpose:**

To confirm a 100 % mortality for more than 30,000 effective insects

- **Materials**

Test insect	: ***B. dorsalis***
Target stage	: **Mature eggs**
Mango size	: **250-300 g**
Maturity	: **Mature green to ½ ripeness**

- Mango were obtained from Minuwangoda area
- 200 mature eggs were inoculated per fruit

Large scale mortality test by VHT

- **Methods:**

Treatment conditions:

Setting of VHT machine	: Program mode
Setting Value of Chamber Temp	: **47.5 ºC (+1 ºC)**

Target Temperature : **47 ºC + Holding Time 8 Min**.
(Core Fruit)

Relative Humidity : **55% - 95%**

- Both control and treated fruits were kept in air circulation plastic container at 22^0C until eggs become 3rd install larvae in control fruits
- This test was repeated until total estimated number of test insects based on the number of survivors in control plot become over 30000

Results of large scale mortality test

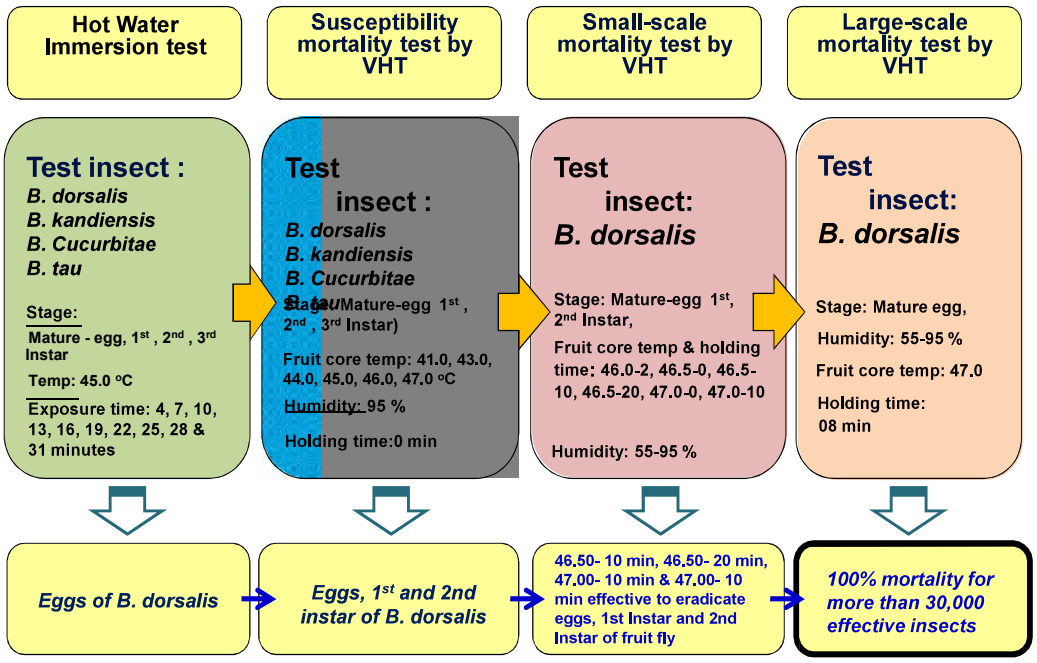
Number of test fruits, no. of survivor and corrected mortality in the Large Scale Mortality Test, *B. dorsalis* (Mature egg) in VHT

Replication	Control		Treatment - 47 ºC + Holding Time 8 Min			
	No of fruits	No of survivors	No of fruits	No of effective insects	No of survivors	Corrective mortality
1	18	1146	54	3438	0	100
2	18	1259	54	3777	0	100
3	18	1229	54	3687	0	100
4	18	896	54	2688	0	100
5	18	2211	54	6633	0	100
6	19	1876	57	5628	0	100
7	18	2013	54	6039	0	100
Total	127	10630	381	31890	0	

More then 30,000 effective insects

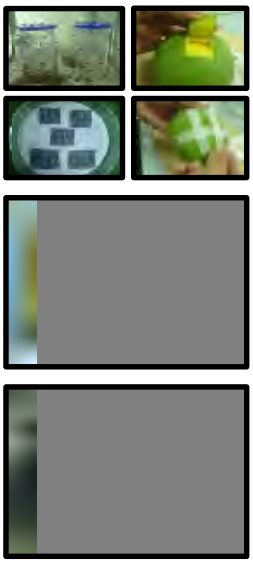
Complete mortality

Summary



Recommendation

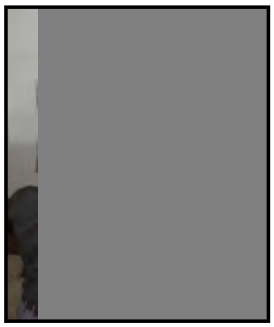
- VHT condition with 47.0 ºC of fruit core temperature and 08 minutes holding time proved a 100% mortality for more than 30,000 effective insects
- Therefore, on commercial scale treatment, these conditions can be used as a standard to ensure complete mortality of all stages of ***B. dorsalis , B. kandiensis, B. cucurbitae and B. tau***



Vapor Heat Treatment against fruit flies in mango (Var. TomEJC)

Effect of Vapor Heat Treatment on eradication of fruit fly *Bactrocera dorsalis* (Diptera: Tephritidae) in export TJCmango

Test fruits



Programming VHT machine

Mortality Test

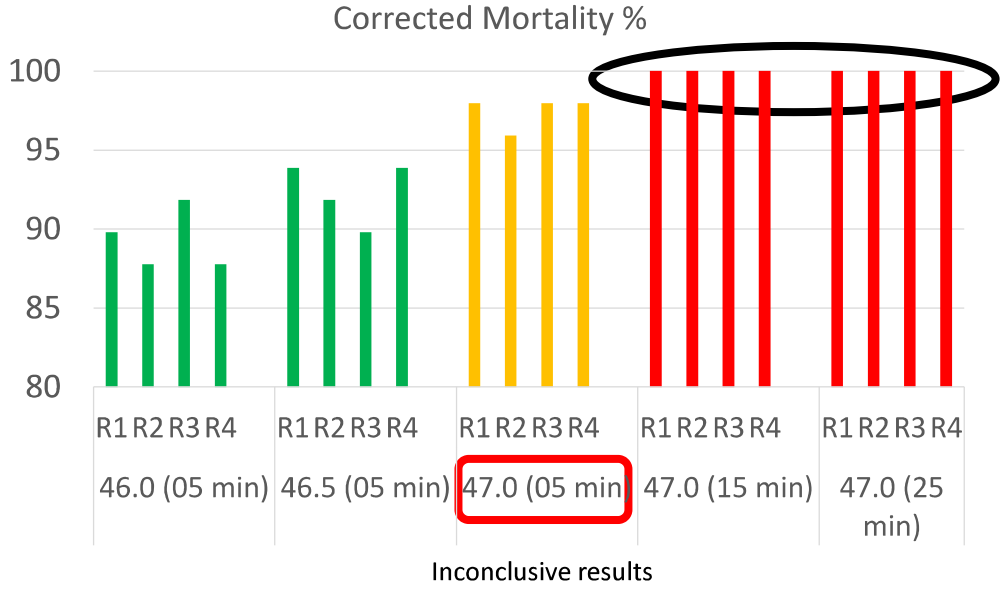
Fruit Injury Test

Small-scale mortality test by VHT

- A total of 36 TJC mango were used for the experiment and among them 6 mangos were infected with 1st instar (50 instar per mango)
- Six un-infested mangos were kept as control and remaining 24 mangos were used to evaluate the fruit quality
- Treatment was conducted by applying different temperature-time intervals at 95% R.H

Temperature (Time)
46.0 ^{0}C (05)
46.5 ^{0}C (05)
47.0 ^{0}C (05)
47.0 ^{0}C (15)
47.0 ^{0}C (25)

Results of small-scale mortality test



Inconclusive results

Result :

47°C for 15 & 25 min were found to be effective for eradication of *B. dorsalis*

Test on Consumer Preference

47.0^{0}C (15min)

	Median	S/NS
Color	2.0	S
Odour	1.5	S
Texture	2.0	S
Taste	1.5	S
Overall Acceptance	15	S

(Wilcoxon Signed Rank Test)

Conclusion is consumer preference is high for the all the attributes with compared to control

Fruit injury test

47.0^{0}C (15min)

Treatment level	Avg. pH value		Avg. Brix value		Avg. Hardness value	
	Just after	72 h	Just after	72 h	Just after	72 h
1	4.03^a	5.4^a	12.7^a	22.3^a	2.6^a	1.8^a
2	4.07^a	5.5^a	11.0^a	21.7^a	2.4^a	1.7^a
3	4.10^a	5.6^a	13.7^a	22.0^a	2.6^a	1.9^a
4	4.06^a	5.5^a	15.3^a	22.3^a	2.4^a	1.8^a
Control	4.00^a	5.6^a	14.7^a	22.3^a	2.5^a	1.8^a
P-value	**0.936**	**0.648**	**0.069**	**0.989**	**0.435**	**0.943**

*The numbers which was followed by the same letter on the same column is not significantly different based on Tukey-test (α = 5%)

Hardness test

pH test

Brix test

Conclusion

- **Due to the inconclusive data obtained for 47.0^{0}C (05 min), 47.0^{0}C (15min) was selected as the effective VHT treatment standard to eradicate fruit fly in TomEJC mango**

Trade Negotiations for the exportation of Sri Lankan fresh fruits

- On going negotiations with Japan, Republic of China, Republic of Korea and USA to export Sri Lankan fresh mangoes
- Exportation of fresh mangoes (Tom EJC) was permitted to Jordan after the certification of VHT facility at NPPO Sri Lanka by Jordanian Technical Team

Large Scale Tom EJC Mango Orchards in Sri Lanka

Thank You !

National Plant Quarantine Service

Department of Agriculture

Canada Friendship Road, Katunayake

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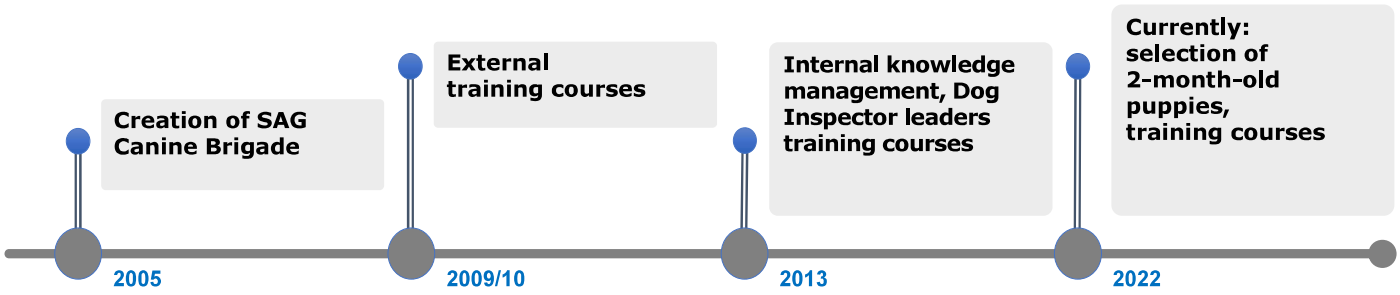
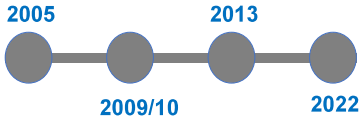
Web: https://doa.gov.lk/npqs-home-en/

Canine Brigade - SAG

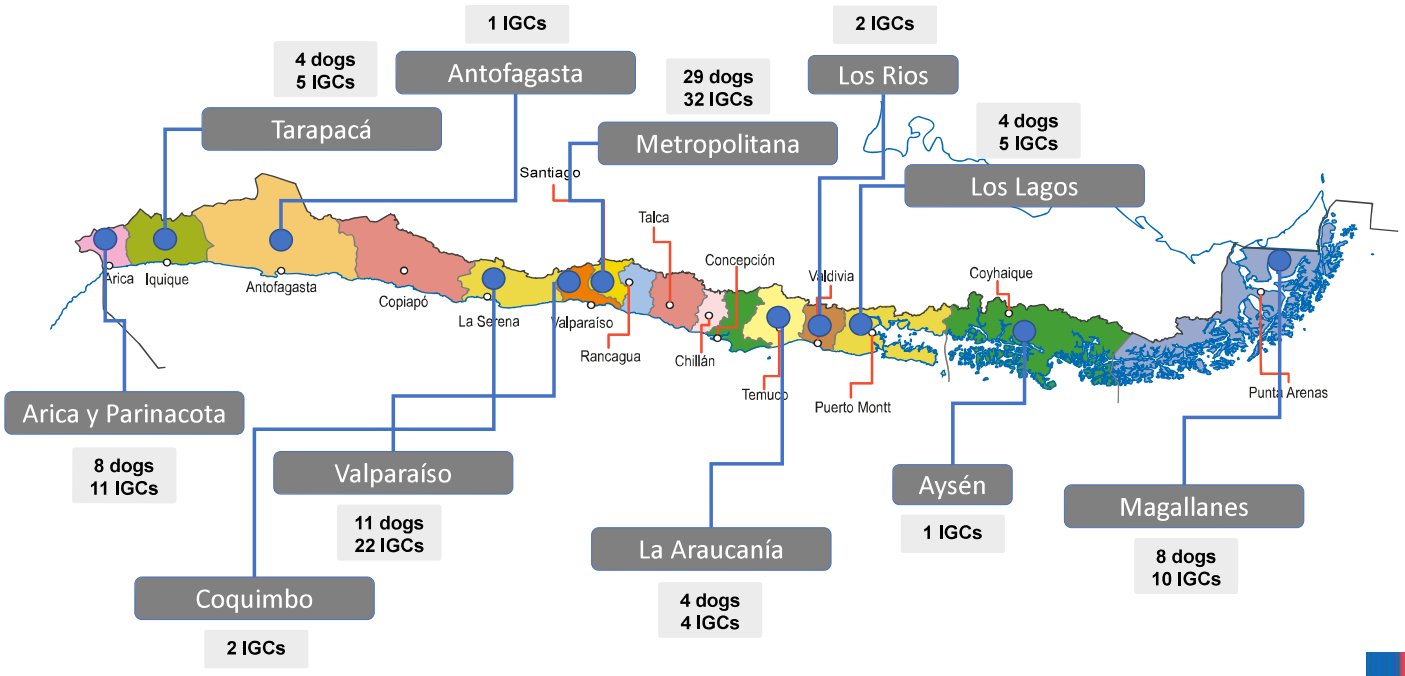
Oscar Camacho Inostroza

Overview: Brief timeline

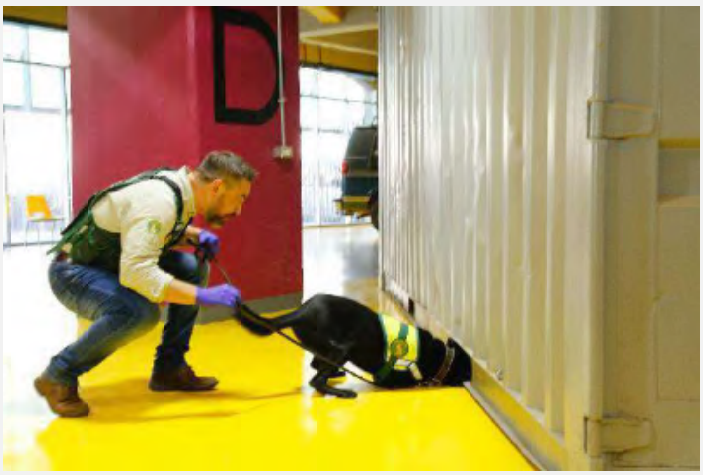




Overview: National Presence



Detector Team is the operating unit of SAG Canine Brigade, consisting of:



Dog Inspector leaders

The Dog Inspector leader (IGC) is an Official SAG Inspector, who possesses the knowledge and skills to work at the border with an operational detector dog

Region	Total
ARICA Y PAR	11
TARAPACA	5
ANTOFAGASTA	1
COQUIMBO	2
VALPARAISO	22
METROPOLITANA	32
LA ARAUCANIA	4
LOS RIOS	2
LOS LAGOS	5
AYSEN	1
MAGALLANES	10
Grand total	**95**

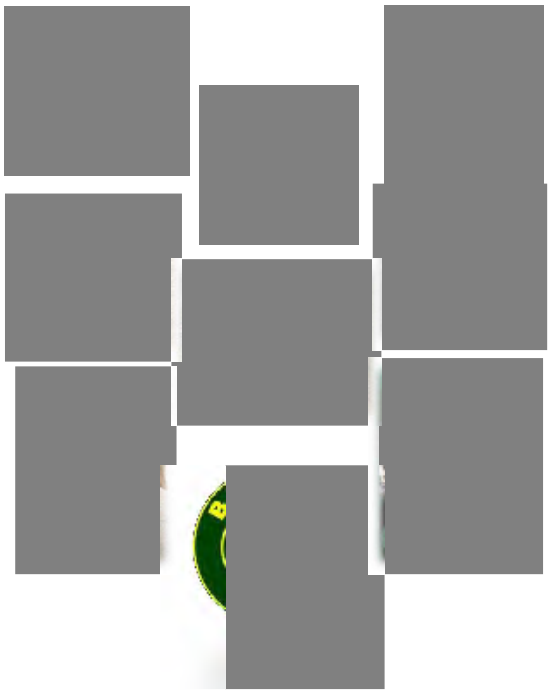
Detector Team is the operating unit of SAG Canine Brigade, consisting of:

Detector dog

Dog trained to detect by smell the odour of products whose entry into Chile is regulated by the Agriculture and Livestock Service, due to their high risk of introducing pests or diseases of economic importance for the country, such as: fruit fly, African swine fever, foot and mouth disease, classical swine fever, etc

Region	Total
ARICA Y PAR	8
TARAPACA	4
VALPARAISO	11
METROPOLITANA	29
LA ARAUCANIA	4
LOS LAGOS	4
MAGALLANES	8
Grand total	**68**

Management of dogs team, through a rigorous selection process of candidate dogs



Dogs aspiring to the Canine Brigade come from:

- Donations from private and non-governmental organisations (NGOs) such as foundations, through signed agreements
- Purchases of dogs from dog kennels

3 Stages:

- Stage I, behavioural assessment: A commission of experts on site applies a series of behavioural challenges.
- Stage II, veterinary assessment: A series of tests are applied to determine health compatibility with a working dog.
- Stage III, training assessment: Within 3 months the dog should be able to learn the inspection technique and detect 12 basic odours of interest to SAG.

Follow-up:

- By continuous monitoring, through technical evaluations and performance at the border.

End of a dog's service:

- Decrease in performance.
- Injury and/or illness.
- Older than 6 years.

Training particularities of SAG Canine Brigade

- A dog can work with different Dog Inspector guides.
- In 3 months the dog learns the inspection technique.
- Positive reinforcement (rewards), which can be tangible or intangible.

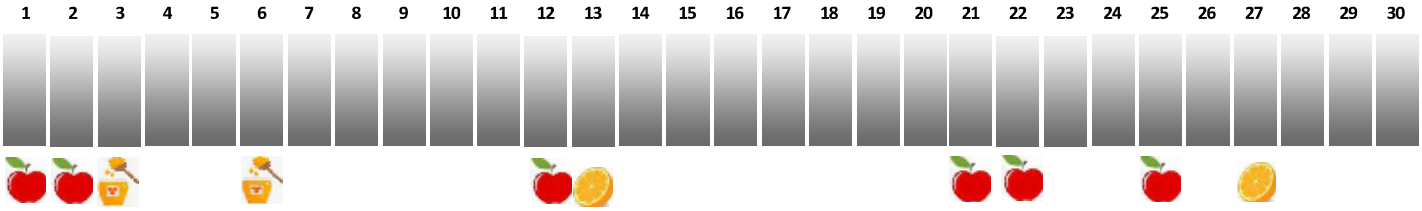
Positive reinforcement, rewards.

Tangible: controlled delivery of the "apport" (reward/toy) to the detector dog after marking or pointing.

Intangible: positive reinforcing words are used to reward the mark made by the detector dog without using the "apport".

Technical evaluation, methodology

- Walk the detector dog through a line of 30 plastic cones.
- A sieved plastic capsule (DEC = Canine Training Device) with a piece of a product of SAG interest is hidden inside 10 cones.
- Three odours implanted in the olfactory memory of the dogs, based on previous training records, are used.
- The products are randomly arranged in proportion to the most frequently intercepted products at national level, e.g. apple (6 DECs), orange (2 DECs) and honey (2 DECs).

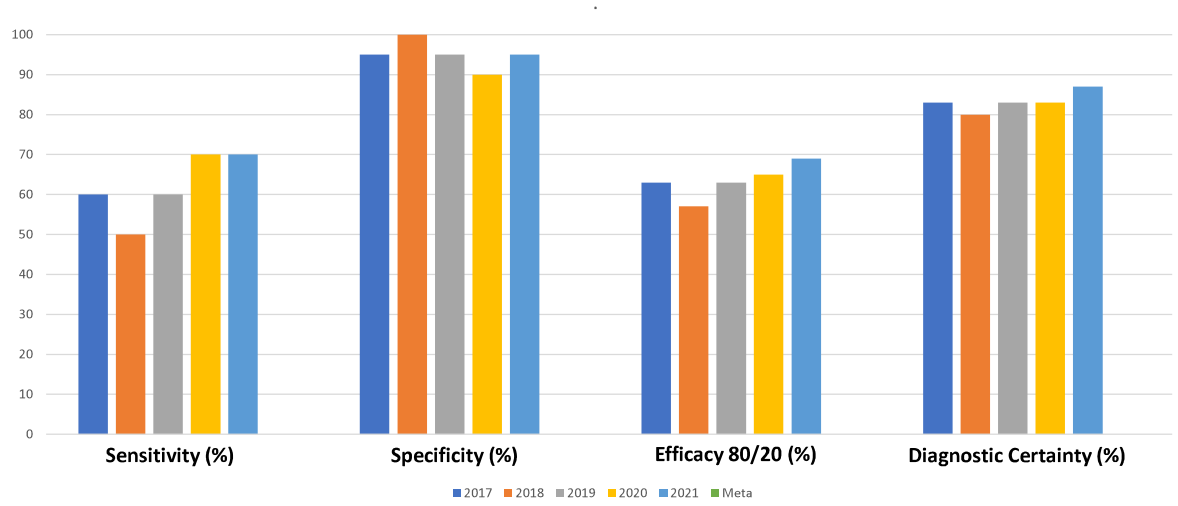


Technical evaluation, results from 2017 to 2021

Region	Sensitivity (%)					Specificity (%)					Efficacy 80/20 (%)					Diagnostic Certainty (%)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Arica y Parinacota	35	45	55	55	80	95	95	90	92	90	47	57	57	60	62	75	80	80	80	80
Tarapacá	80	55	65	80	80	95	95	95	80	95	77	58	69	61	72	90	80	87	80	87
Valparaíso	60	40	60	75	80	100	100	95	80	98	62	53	66	58	66	83	78	83	78	83
Metropolitana	60	60	60	70	80	100	100	100	100	100	63	62	63	76	84	83	83	83	90	93
La Araucanía	-	-	-	-	100	-	-	-	-	98	-	-	-	-	96	-	-	-	-	99
Los Lagos	60	60	80	65	80	95	100	85	85	83	62	61	79	60	66	83	82	85	81	83
Aysén	55	40	70	80	70	88	100	90	95	85	55	55	65	77	60	77	80	83	90	80
Magallanes	70	50	50	70	50	95	95	95	92	80	69	59	69	67	44	87	82	73	83	69
National	60	50	60	70	70	95	100	95	90	95	63	57	63	65	69	83	80	83	83	87

Important data:
- 386 detector teams evaluated in these 5 years.
- 4 years old dogs on average.
- The older the age of the dogs, the performance decreases significantly in the Efficacy 80/20 and Diagnostic Certainty parameters.
- In 2021 the best performance in terms of efficacy parameters was achieved.

Technical Evaluation. National summary results from 2017 to 2021



Some of the detections that SAG Canine Brigade has made

1,800 kilos of hazardous products
Chungará, Arica y Parinacota

Equine hooves and hoofs
Santiago International Airport

Snails in household goods
Valparaíso Port

21 exotic birds
Los Libertadores, Valparaíso

Seeds attached to the body
Santiago International Airport

Boa skin
San Sebastián, Magallanes

Ambystoma mexicanum hidden in body clothing
San Sebastián, Magallanes

Experience at Santiago International Airport

Canine Brigade module

- 2 modules for the exclusive inspection of passengers and hand luggage with detection dogs. Each module has 2 rows.
- Up to 2 detection teams can work in each row.

Strengths of the Detector Team

Wide range of odours of interest

- About 30 different odours.

Pest odours in some dogs (*Halyomorpha halys, Lymantria dispar*, Asian race), and other types of odours, such as nests of bird species at risk).

Versatile in different scenarios

- Types of control (air, sea, land)
- They can reach places that are difficult to access.

High effectiveness

- Over 80% of hits

The annual technical evaluations carried out on the detector team show the ability to detect at least 8 out of 10 hidden odours of SAG interest.

High inspection productivity

Automobiles: 1,5 minutes.

- Buses: 5 minutes.
- Trucks: 3 minutes.

Operational time

- 30 to 60 minutes.
- Rest for 5 to 15 minutes.

Facilitation of entry

- Short control times.

Detection team significantly facilitates the entry of means of transport at border control.

Transportable

- They can be taken to another location upon request.

Institutional videos of SAG Canine Brigade

- Unprecedented research unites RENARE and SAG Canine Brigade of Tarapacá Region https://youtu.be/SJRRpvaEh14
- SAG Canine Brigade: attentive, willing and trained https://youtu.be/0h4sqj6o5KI
- Encounters with SAG History Series: Chapter IV "The BRICAN Canine Brigade" https://youtu.be/zmMh2ZZ6sQw

Thank you!!!

4.2 **Using advances in technology for biosecurity risk detection** *Joel Willis, DAWE (Australia)*

Our Investment in New 3D X-ray Technology

Algorithm Development

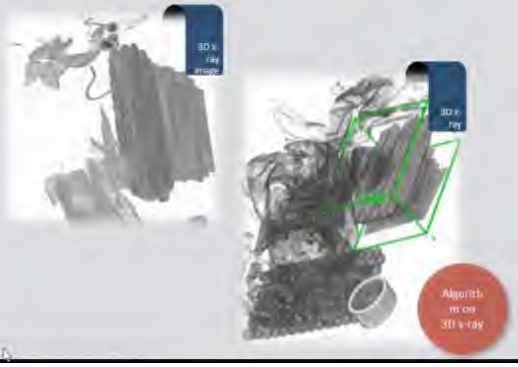
3D Algorithm Development

Current Algorithm Development

In partnership with NZMPI and Rapiscan we have developed algorithms to automatically detect biosecurity risks for:

Meat **Fruit**

Vegetables **Seafood**

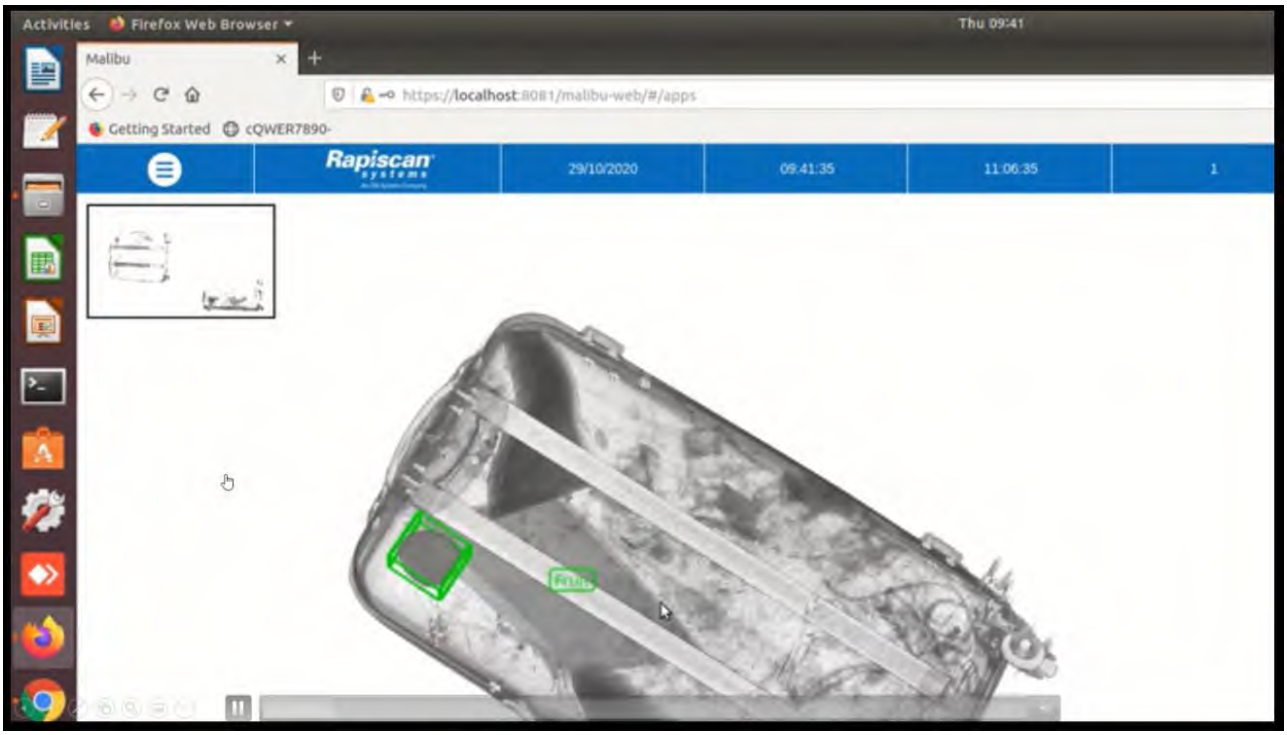


Future Algorithm Development

Algorithms are now being expanded to incorporate automated detection of wildlife and trafficable animal parts such as:

Ivory **Rhino horn**

Turtle shell **Tortoise Shell**



Concealed Succulents

The power of a 3D X-Ray

- In 2021 the 3D x-ray screened a parcel arriving from China labelled as 'Clothes'.
- Following the initial 3D X-Ray scan the parcel was inspected and found to have 83 succulents concealed within decorative cushions.

3D Algorithm Development

Melbourne Jet Base Testing Facility

- An RTT 110 3D x-ray unit located at Melbourne Jet Base is being used to validate algorithms and build our image library.
- High risk commodities are scanned through the machine multiple times, in different positions, placed in bags and boxes with items of no concern.
- The more the commodity is scanned the stronger the algorithm becomes ensuring a higher rate of detection.

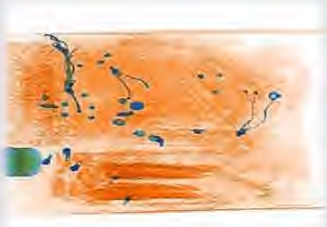
2D Algorithm Development

As well as our successful work on 3D x-ray, we continue to trial our 2D x-ray automated detection algorithms at our dog facility in Brisbane. The department is partnering with both Rapiscan and Smiths to inform our future 2D hardware and software strategy.

Rapiscan 927 DX 2D x-ray unit

- Trial commenced early 2021
- Building meat image library to provide data to inform algorithm development
- Meat detection algorithm is soon to be deployed on to the Rapiscan 2D x-ray unit

Our 2D X-ray Trial Machines help to develop algorithms for future deployment



Smiths 100 100 V-2IS 2D x-ray unit unit

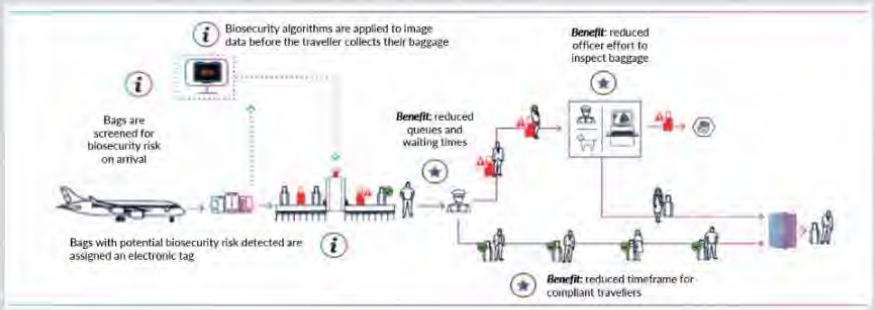
- The trial for the Smith's unit is in early stages of data gathering and validation
- Focus is on validating algorithms and building the image library

Passenger Baggage Pre-Screening Trial

Passenger Baggage Pre-Screening Trial

Onshore Pre-Screening

- Test onshore operations in 2 locations
- The onshore trial will screen hold baggage after arrival but prior to the passenger collecting their baggage
- As bags are unloaded onto the baggage handling system they will be scanned by the 3D x-ray unit
- 3D x-ray images will be sent to a control room where biosecurity officers will assess the contents for biosecurity risk material



Passenger Baggage Pre-Screening Trial

Concept and Design

Concept and design stage for installation of an RTT110 3D X-ray unit into Brisbane airport.

What's next:

- Detailed scoping of technology solutions
- Investigate baggage tracking concepts
- Concept of operations for remote screening and passenger flow

Installation of RTT110 3D X-ray unit into airport baggage handling.

Our Investment in New 3D X-ray Technology

3D X-ray in Mail Centres

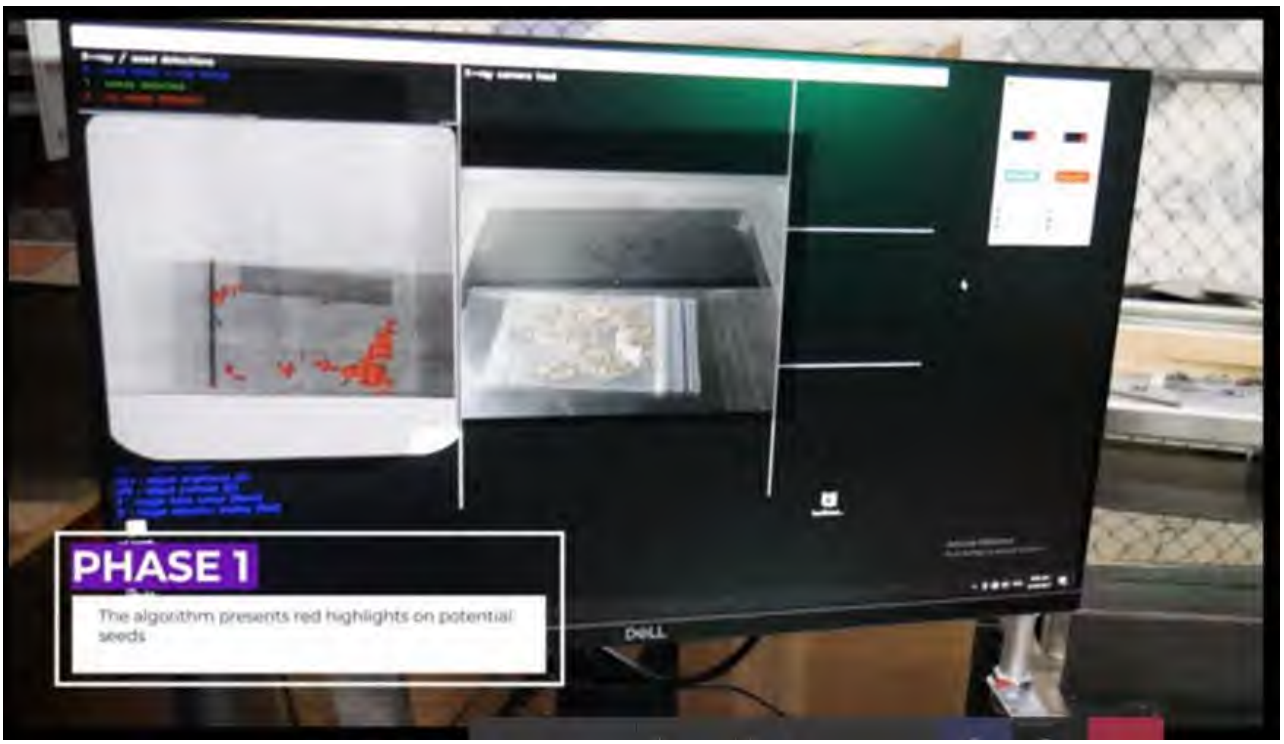
- The purpose of the project is to build on the early benefits that have been realised through existing RTT installations at SGF & MGF mail centres
- Three additional RTT 3D x-ray units will be installed at international mail centres
- The additional RTT units will further enhance and streamline the detection of biosecurity risks

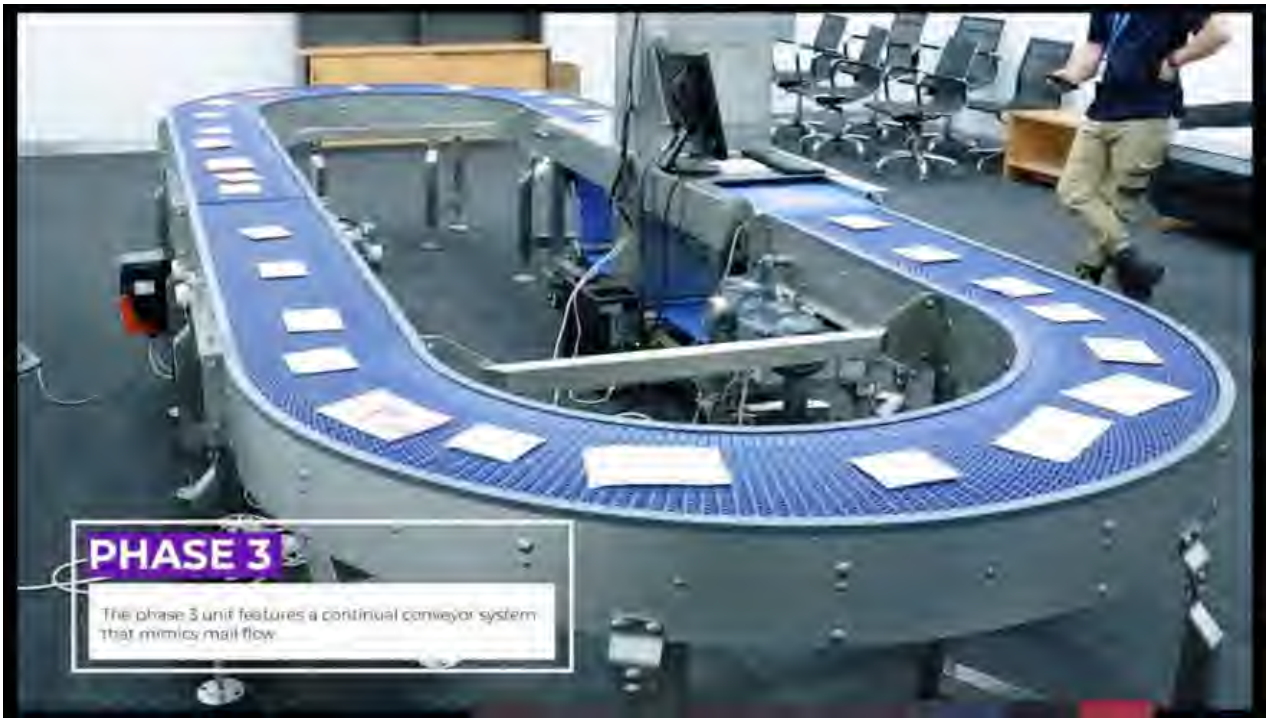
Remote Screening

Sydney Gateway Facility

- Our first remote screening room has been set up at the Sydney Gateway Facility.
- Biosecurity Officers will have the ability to screen incoming mail without physically having to be on the operational floor.
- Screening rate increased over traditional screening method

4.3 **Biosecurity Innovation** *Melissa Hindle/Jessica May, DAWE (Australia)*


PHASE 1
The algorithm presents red highlights on potential seeds


PHASE 3
The phase 3 unit features a continual conveyor system that mimics mail flow

Low Energy X-ray for Seeds

Seed Automated Algorithm

- Current 2D or 3D x-rays are too high energy resulting in them not detecting small seeds.
- High energy x-ray is likely to penetrate through the item resulting in no image being produced.
- Low energy, high resolution x-ray technology is currently in stage three of the project.
- It is expected the prototype will be trialled at a mail gateway facility following the conclusion of phase 4.

Phase 1 — Phase one successfully tested the prototype and proof of concept on a stand-alone unit.

Phase 2 — Phase two of the project had Rapiscan prove the concept of auto-detection of seed packets and their contents using video cameras, low energy x-ray and computer algorithms on a moving conveyor system.

Phase 3 — Validating the bespoke solution to prove high algorithm efficacy rates with increased throughput levels.

Phase 4 — Phase will deploy a full prototype unit at Melbourne Jet Base to test conveyors and robot pickers in a final trial. Currently scheduled to conclude in late 2022.

Hades-5Z Inspection Robot

TECHMATICS NZ
CUSTOM INSPECTION ROBOTS

Purpose

- Conduct vehicle (used and new) and used machinery inspections
- Reduce WHS risk for biosecurity officers
- Safer inspections for Biosecurity Officers

The Technology

- Remote-controlled device
- Fitted with both a thermal & high-definition camera
- Specialising in crawl space inspections

The Trial

The trial will test the robot's ability to:

- Maneuver across a range of surfaces
- Provide accurate images identifying biosecurity risk materials under a range of environmental conditions
- Undertake safer and more efficient inspections

RingIR

About RingIR

Detecting fumigants using real-time vapour detection

Phase 1 of this project confirmed that the RingIR technology can detect all three fumigants of concern - methyl bromide, sulfuryl fluoride and phosphine.

Phase 2 has commenced and is split into two sub-projects:

1. To develop a portable prototype to detect all three fumigants that could be trialled in our operations by 30 June 2022.
2. To test whether RingIR technology can be expanded to identify hitchhiker pests associated with containers.

BIOSECURITY INNOVATION

Benefits of RingIR

- Biosecurity officers can work in a safe environment.
- Reduction in delays caused by possible Photo Ionisation Detector false alarms.
- Reduction in unnecessary treatment of containers where no pests are present.

Biosecurity Detector Dogs

按 Ctrl+Shift+M 鍵，以將您的麥克風取消靜音。

Biosecurity Detector Dogs

Detector Dog Fleet

- The current detector dog fleet consists of:
  - 42 Operational Dogs
  - 47 Handlers
  - 2 Dogs in training
- Latest dog to complete training "Finlay" is trialling a "Passive" response across all deployment scenarios.

Target Commodities

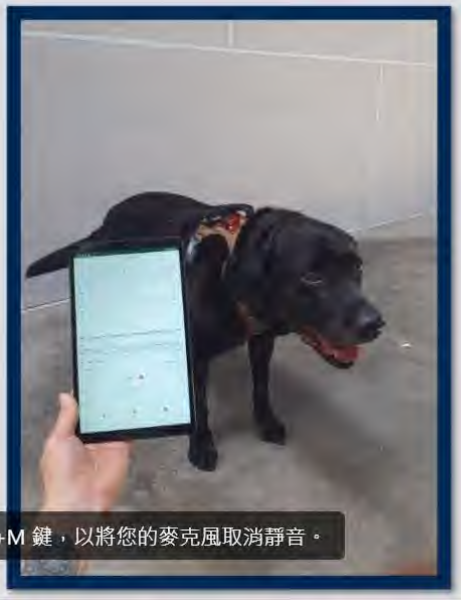
Detector dogs are trained to detect seven commodity groups, which are estimated to contain 200+ individual commodities:

- Fresh fruit
- Fresh vegetables
- Fresh plant material (including cuttings)
- Viable seeds and bulbs
- Meat (excluding fish)
- Eggs
- Brown Marmorated Stink Bugs (BMSB)

Detector Dogs Innovation

Detector Dog Innovation – Canine Character Assessment

- The department is partnering with the University of New England to identify the traits and behaviours inherent in our top performing detector dogs.
- This work will inform the development of future detector dog selection processes.
- Researchers fit each dog with a specialised harness equipped with a variety of sensors, including an accelerometer and ECG monitor.



Velvet – the first dog to sniff out BMSB

Sniffing out BMSB through the cargo pathway

- In 2018 we began an innovative project with the University of New England to train our detector dog fleet to sniff out Brown Marmorated Stink Bug (BMSB).
- In November 2021 Velvet was the first detector dog to find a live BMSB.
- During a cargo inspection of over 800 vehicles and over 150 bulk break items Velvet sniffed out a single live BMSB on an off highway Caterpillar Truck.
- This live sample was confirmed as a BMSB and subsequently used to train and test the entire Brisbane detector dog fleet.

Questions


Australian Government
Department of Agriculture, Water and the Environment
BIOSECURITY
We are looking for new approaches that can drive improvements to our services and risk management
Analytics and Innovation
Biosecurity Strategy and Reform Division
Department of Agriculture, Water and the Environment
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About us
The Research & Innovation Section leads a centralised research and innovation capability to guide and support the identification, development, and implementation of innovative technologies and approaches:
Innovation Ideas
Engage with stakeholders and share our stories to identify bold new ideas.
Innovation Pilots
Test innovative technologies that are available now and can change how we work today.
Biosecurity Innovation Programs
• Biosecurity Innovation Program - invests $5m on technologies and approaches to enhance the capacity of our national biosecurity system
• Science Innovation Program - invests $1.7m in projects identified through various community of practices.
Biosecurity Risk Research
Through our partnership with the Centre of Excellence for Biosecurity Risk Analysis (CEBRA) at the University of Melbourne, undertakes a range of targeted research projects that help inform regulatory activities such as risk analysis.

Our Biosecurity Innovation Program (BIP)

Invests in new technologies and approaches to enhance Australia's biosecurity system – with applications open to the public.

Our focus

The Program assists in identifying, developing and implementing innovative technologies and approaches to improve biosecurity risk management.

Focuses on technologies that address emerging biosecurity challenges, assist with screening of goods and travellers, and that improve early detection beyond ports.

It supports collaboration between industry and government and helps Australia maintain our favourable pest and disease status and our access to export markets.

Australian Government
Department of Agriculture, Water and the Environment

BIOSECURITY

How to apply for BIP funding

Expression of Interest	Review	Prioritisation and Approval	Project Delivery
• EOI applications invited from internal / external applicants. • Next round opens in October-November 2022.	• EOIs are reviewed and shortlisted applicants are invited to submit a more detailed proposal with a departmental project lead.	• Proposals are evaluated and prioritised, with successful projects endorsed for funding by an executive committee.	• Projects are contracted and we work together to deliver the project.

Some of our BIP projects underway...

Rapid diagnostics at PIC@PEC

Building our diagnostic capability

eDNA for biosecurity identification

Testing eDNA technology to detect pests, parasites and diseases

Brown Marmorated Stink Bug App

Mobile identification of brown marmorated stink bug

Our Innovation Pilots initiatives

We're piloting new ideas and novel approaches to help make tasks safer and more efficient.

Our focus

This program of work generates and pilots ideas using technology available now to optimise how we work today.

Pilots are run in short, sharp cycles to test ideas in the field which involves pilot design, sourcing assets and supporting pilot activities right through to evaluation & final recommendations.

If you have any ideas contact **innovationpilots@awe.gov.au**

Some of our Innovation Pilots underway...

Realwear Smartglasses

Testing our livestreaming capability in numerous areas

Large scale aerial imagery

Investigating aerial systems for surveillance of feral pigs and buffalo

'temi' the telepresence robot

Discovering new ways of doing things without the need to be physically present

Boston Dynamic's 'Spot' the robot

Exploring our robotic capability to work more efficiently and safer

Our Risk Research Program

Through the Centre of Excellence for Biosecurity Risk Analysis (CEBRA), we undertake targeted research to ensure biosecurity regulatory standards, procedures and tools are underpinned by world-class research.

Our focus

CEBRA's research activities help ensure that governments are leaders in biosecurity risk management by undertaking collaborative research that informs a range of regulatory activities.

This includes risk analysis (the assessment, management, and communication of biosecurity risk), setting of regulatory interventions, inspection activities and surveillance.

THE UNIVERSITY OF MELBOURNE

Some of our completed Risk Research projects...

Compliance-based intervention scheme

Rewards importers of selected plant products who demonstrate consistent compliance

Australian Animal Disease Spread Modelling Framework

A decision support tool to assist with policy and response strategies for emergency animal diseases

Value of Australia's biosecurity system

A model that puts a dollar figure on how much value the national biosecurity system provides by protecting assets

Innovation - from research to reality

There are many examples in our work where research projects and innovation initiatives interconnect and help to provide an end-to-end solution to key challenges the department is facing. One example is biofouling management.

Biofouling is one of the major pathways for translocation of marine pests.

The department is currently developing new biofouling requirements to better manage this biosecurity risk.

Our team have been working with the Marine Biosecurity Unit on several projects to help us work more efficiently and effectively in this space.

From world-class research with CEBRA to piloting remotely operated vehicles, its an exciting journey to be a part of.

Our biofouling journey....

INNOVATION PILOT

Remotely Operated Vehicles

Testing the effectiveness of ROV's to conduct biofouling inspections

RESEARCH

CEBRA

Developing automated image analysis approaches to assess biofouling

INNOVATION PROJECT

Maritime Pathway Risk Decision Support Tool

Machine learning to provide forecasts on the level of a vessel's biofouling