

行政院及所屬各機關因公出國人員出國報告

出國類別：其他(國際研討會)

## 參加「第3屆國際農藥研討會:環境、安全及法規」

(The 3<sup>rd</sup> International Workshop on Crop Protection Chemistry in Latin

America: Environment, Safety and Regulation)

### 報告書

服務機關：行政院農業委員會農業藥物毒物試驗所

出國人員：高清文所長、陳妙帆副研究員

研討會地點：巴西里約熱內盧

出國期間：2009年11月07日至2009年11月17日

報告日期：2009年12月10日

## 摘要

本研討會提供各國從事農藥之化學、殘留量、容許量、取食安全、法規、全球整合、環境、風險評估等之人員，藉由各國最新研究及訊息之發表，了解國際間最新的發展，以促進各國相關工作之推展。本所於此研討會中亦進行一篇研究成果壁報之發表。研討會日期自 2009 年 11 月 9 日至 12 日，其內容主要分為五大主題，包括「Innovative Chemistry and Technology for Crop Protection」、「Risk Assessment, Regulation and Global Harmonization」、「Environmental Chemistry and Risk Assessment」、「Pesticide Residue in Food and Human Exposure」及「Education and Information Management in Crop Protection」。各主題分別邀請加拿大、美國、英國、巴西及台灣等不同國家之農藥領域專家報告生產履歷及認證體系、農藥在農業生產所扮演之角色、貢獻及歷史發展，並說明生物技術、生物農藥及低風險化學農藥之開發及趨勢、風險評估對法規政策之重要性、加速推動並落實資料審查之電子化系統、農藥對水域、土壤、空氣及生態等環境影響之風險評估方法、全球農藥殘留整合之策略、取食風險評估、農藥資訊網及學習系統 (e-learning)，以促進資訊之交流及共享、並強調農藥業者應有之職責 (stewardship)，以促進優良產業之永續發展等。臺灣雖地小但作物及病蟲害種類多樣化，基於對環境、生態、食品及人類永續發展之基本要求，有關農藥之安全使用及暴露等管理及評估方式並無不同，各國專家之報告及建議，期能作為我國訂定相關策略及標準之參考。

關鍵詞：農藥、殘留量、殘留容許量、風險評估、永續發展

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## 一、 目的：

本次研討會之目的是希望參與人士能瞭解國際間農藥的法規管理、風險評估、標準制定等之最新發展及對未來之願景。主要邀請來自國際上相關領域之專家，報告他們在這些範疇的工作經驗、成果和心得。本研討會之內容與本所業務極為相關，希望藉由參與此研討會以更加瞭解國際上「農藥殘留」風險評估、管理、標準訂定之最新訊息，以促進我國相關工作之推動。

## 二、 研討會程序：

本次研討會之指導委員會、組織及贊助單位如表一，主要為 IUPAC、里約化學協會及世界各國植物保護團體。研討會日期自 2009 年 11 月 9 日至 12 日，並包括 13 日參觀相關研究機構及農田（程序如表二）。巴西主要之農產品為熱帶水果如香蕉、柑桔、芒果、鳳梨、西瓜、木瓜等及各類作為生菜之蔬菜、番茄、甘蔗、玉米、棉花、煙草、旱稻、咖啡、可可、羊、豬及牛肉等，多為大面積之栽培及管理，不僅供其國內所需，亦有大量農產品外銷至世界各地，因此，主要由巴西農業部負責相關產業及農藥之管理。研討會之進行及內容摘要如下所述。

## 三、研討會內容

研討會之內容可區分為如下之五大主題：

Theme 1 – Innovative Chemistry and Technology for Crop Protection

Theme 2 – Risk Assessment, Regulation and Global Harmonization

Theme 3 – Environmental Chemistry and Risk Assessment

Theme 4 – Pesticide Residue in Food and Human Exposure

## Theme 5 – Education and Information Management in Crop Protection

每一主題邀請相關領域之專家進行 2-4 場之演講，並有學術海報之發表，主題 1 有 3 篇，主題 2 有 6 篇，主題 3 有 25 篇，主題 4 有 16 篇，主題 5 有 4 篇，共 54 篇，本所於主題 3 發表 1 篇關於有機添加物對土壤中可尼丁分解之影響。

於開幕程序中，特別安排 IUPAC 主席 Kenneth D. Racke 簡介 IUPAC 之組織及功能，並預告將於 2010 年 7 月於澳洲舉辦「The 12<sup>th</sup> IUPAC International Congress of Pesticide Chemistry」。並由巴西農業部生產及永續發展部門 Savio Jose Barros deMendonca 報告「保障食品安全之策略：生產履歷及認證體系」。自 2009 年開始，因人為因素造成之氣候變遷，人類對食物之需求約增加 25%，約有 100 萬人口處於飢餓及營養不良狀態，至 2050 年，約有 18 億人口將面臨缺水之問題。因此，必須以監測、管制、生產履歷、認證及整合生產等之方法，以達到永續生產安全之食品及動物飼料之目地。近年來，相關之法律(Consumer Law)已保障消費者有權知道產品及服務之相關訊息，以降低消費之風險。針對不同之農畜產品，皆有相關之標準操作規範，不僅要提高產品之品質，並減少廢棄物、農藥、肥料之污染問題，但仍應進行經濟及市場之評估。

依據五大主題，摘錄研討會中較具代表性之報告如下：

### **Theme 1 – Innovative Chemistry and Technology for Crop Protection**

本主題邀請加拿大 Gerald Robert Stephenson、美國 Kenneth D. Racke 及巴西 Maria de Fatima Grossi de Sa 等 5 人報告農藥在農業生產所扮演

之角色、貢獻及歷史發展，並說明生物技術、生物農藥及低風險化學農藥之開發及重要性。

## **Theme 2 – Risk Assessment, Regulation and Global Harmonization**

### **(一) 法規決策過程中風險評估之重要性**

加拿大(Centre for Toxicology and Department of Environmental Biology, University of Guelph)Keith R. Solomon 報告進行法規決策時風險評估之重要性。風險評估時必須有確認之評估標的(endpoints)，資訊公開透明，並使評估者獨立於管理者之外。雖然法律上常已訂有一些管制標準，如歐盟訂定水中單一農藥及多種農藥之管制基準分別為 0.1 及 0.5 ug/L，但每種藥劑之毒性及實際攝取之風險等仍有待進一步之評估。

### **(二) 全球農藥殘留之整合**

由美國 BASF Volker Bornemann 以農藥業者之觀點，提出對全球農藥殘留整合之建議，希望 OECD 能加速推動並能落實全面之電子化，以減少文件檔案之保存空間及審查時間。

## **Theme 3 – Environmental Chemistry and Risk Assessment**

由荷蘭、美國、加拿大及巴西等國之專家報告目前有關農藥對水域、土壤及空氣等環境影響之風險評估方法及結果，及對鳥類、青蛙等野生動物及生態之影響，並建議可利用緩衝區及廢棄乾草等之設置，以降低農藥之溢流 (run off) 或淋洗 (leach) 而污染底層及水域。

## **Theme 4 – Pesticide Residue in Food and Human Exposure**

## (一) 全球農藥殘留策略

由美國 Dow AgroSciences Indianapolis 之 Garmen Tiu 提出全球農藥殘留整合策略之建議。目前各國及各國際組織仍依據各自所公告之不同規範來進行殘留試驗、標準及評估之要求，若能進行全球之整合，不僅對生產者、登記業者有利，更利於管理者及消費者之管制及信心。建議由不同之氣候、植物生態進行全球之區域劃分，整併各區域共同之試驗規範及要求，由代表性之氣候、區域及作物來進行全球殘留規範、標準及「minor use」之延伸及整合。

## (二) 全球貿易問題及 MRL 整合

美國 BASF Corporation 之 Philip Anthony Brindle 報告全球 MRL 整合對農產品進出口之重要性。因目前各國不同之 MRL，已造成生產者很大之困擾，但是影響 MRL 之因子包括 GAP、作物種類及分群、殘留量定義、取食量、估算方法等，必須將這些不同之因子進行整合後，才有可能進行 MRL 之整合。目前國際上正進行全球 MRL 整合之組織如下：

1. Codex/JMPR
2. OECD Residue Chemistry Expert Group
3. OECD Expert Group for Minor Uses
4. FAO revision of classification of foods and animal feeds
5. Codex eWG on minor uses & specialty crops
6. Minor Use Summits
7. Regulation (EC)396/2005

8. International Crop Grouping Consulting Committee (US EPA/IR-4/PMRA)
9. NAFTA/OECD MRL Calculator
10. NAFTA Technical Working Group – MRL Harmonization
11. Global Work-Shares & Joint Reviews
12. ASEAN Harmonization of MRLs

### (三) 台灣總膳食評估

由來自台灣農業藥物毒物試驗所殘毒管制組翁前組長愷慎小姐介紹台灣總膳食評估之成果。於 1709 件樣品共 130 種膳食品項中，進行 189 種農藥、ETU、重金屬、黃麴毒素及戴奧辛之 13-65 歲年齡層之攝食風險評估，僅重金屬 Cd 及 Pb 有部份攝食之風險，並僅於 1.1% 樣品中測得佔 5-30%ADI 之農藥殘留，其中，只有 prothiofos 超過 ADI 之 10%。

### **Theme 5- Education and Information Management in Crop Protection**

由英國、哥斯大黎加及巴西等國之專家報告國際上有關植物保護及農藥之專業資訊網站、蒐尋技巧、網路連線及學習系統 (e-learning)，以促進資訊之交流及共享、提升專業之技能及發展；並強調農藥業者應有之職責 (stewardship)、施藥時之防護及定期辦理之相關訓練與獎項之競賽，以促進優良產業之永續發展。

### **心得及建議**

這次能有機會參加研討會瞭解國際間「農藥管理」、「殘留容許量」、



「國際規範」及「全球整和」等相關問題之最新發展，將有助於本所相關業務之發展。臺灣地小但作物及病蟲害種類多樣化，部份農藥之推廣及應用可能異於歐美地區及南美等大面積之栽培管理方式，但基於對環境、生態、食品及人類永續發展之基本要求，有關農藥之安全使用及暴露等管理及評估方式則並無不同，全球不管開發、開發中或未開發之國家，皆是朝相同之目標前進，包括低毒及生物農藥之開發、農藥管理之責任制、快速且有代表性之風險評估方法、全球農藥資訊之共享及整合、降低農藥汙染之方法等。前述摘要各國專家之報告及建議，期能作為我國訂定相關策略及標準之參考。未來，本國應可參考 OECD、Codex 或相關國際組織已建立之資料，加強農藥之教育訓練、食品中農藥殘留的膳食風險評估、風險之溝通與管理方面之研究，及農藥管理責任制之建立，以強化本國農藥管理之制度。並建議本國參與農藥化學、毒理、殘留及風險評估之人員，仍應繼續參與國際研討會或相關會議，如 CCPR (Committee on Pesticide Residues) 會議、歐盟及 IUPAC (國際純粹與應用化學聯合會) 等所舉辦之國際會議，應藉由國際研討會之參與，瞭解農藥及其管理之最新發展，以促進本國相關工作之推動及制度的改善，並增強本國於國際空間發展之機會。

## 附件

表一、研討會委員會、組織及贊助廠商

**Committees and Organization**

<b>Executive Committee</b>	Elizabeth Carazo (Costa Rica)
Irene Baptista de Alleluia Chairperson (Brazil)	Eloísa Dutra Caldas (Brazil)
Kenneth Racke – Co-chairperson (USA)	Francisco Paumgarten (Brazil)
Laura McConnell – Co-chairperson (USA)	Gerald Stephenson (Canada)
	Horácio Beldomenico (Argentina)
	Horácio Heizen (Uruguai)
	Ian Ferris (Áustria)
	Ionara Pizzutti (Brazil)
	Jairo Arturo Dallos Guerrero (Colombia)
	Jan Linders (Netherlands)
	John B. Unsworth (United Kingdom)
	John Clark (USA)
	Keiji Tanaka (Japão)
	Kevin Armbru (USA)
	Maria Lúcia Ribeiro (Brazil)
	Peter Rudolf Seidl (Brazil)
	Roberto Gonzalez (Chile)
	Renato Zanella (Brazil)
	Ronald Parker (USA)
	Tereza Cristina Santos (Brazil)
	Tin Win (Germany)
	Verônica Césio (Uruguay)
<b>Organizing Committee</b>	
Carla Maria Steling (Brazil)	
Celso Augusto Caldas Fernandes (Brazil)	
Otávio Balderrama (Brazil)	
Pedro Luiz de Freitas (Brazil)	
Rinaldo Catta-Preta (Brazil)	
Rosemarie Rodrigues (Brazil)	
<b>Scientific Program Committee</b>	
Adélia Araujo (Brazil)	
Ana Maria Bahia Braga (Brazil)	
Arata Katayama (Japan)	
Cathleen J. Hapeman (USA)	
Caroline Harris (United Kingdom)	
Damiá Barceló (Spain)	
Dimitrios Karpouzas (Greece)	
Francisco Paumgarten (Brazil)	
Gerald Stephenson (Canada)	



表二、研討會行程

**Monday, NOVEMBER 9th, 2009**

Time	Venue	Activities
15:00 - 17:00	Information Desk/Secretariat	Registration
16:00 - 18:00	Auditorium B 4 <sup>th</sup> floor	Course (Part I): <b>Equivalence Process in Brazil</b> Ana Maria Vekic, ANVISA
18:00 - 20:00	Main Auditorium 2 <sup>nd</sup> floor	Opening Ceremony Conference: <b>Traceability and Certification: One Way for Safety Food</b> Savio Jose Barros de Mendonca – Dept. Of Production Systems and Sustainability – Ministry of Agriculture, Brazil
20:00 - 21:30	Foyer 4 <sup>th</sup> floor	Welcome Reception

**Tuesday, NOVEMBER 10th, 2009**

Time	Theme / Lecturer
8:30 - 9:15	<b>Plenary Lecture: Risks and benefits of pesticides in the global perspective</b> (Theme 1 – Innovative Chemistry and Technology for Crop Protection) Gerald Robert Stephenson, School of Environmental Sciences, Univ. of Gueph, Canada
9:15 - 10:00	<b>Plenary Lecture: Importance of risk assessment in the regulatory decision-making process</b> (Theme 2 – Risk Assessment, Regulation and Global Harmonization) Keith R. Solomon – Centre for Toxicology and Department of Environmental Biology, Univ. of Gueph, Canada
10:00 - 10:30	Coffee Break
10:30 - 10:55	(Theme 1 – Innovative Chemistry and Technology for Crop Protection) <b>Invited Lecture: New developments in biotechnology for crop protection</b> Maria de Fátima Grossi de Sá - Embrapa Recursos Genéticos, Brazil
10:55 - 11:20	<b>Invited Lecture: Chemical control of aquatic plants</b> Edivaldo Domingues Velini - UNESP Botucatu, Brazil

11:20 - 11:45	<p><b>Invited Lecture: The Importance of New Active Principle for Agricultural Sustainability</b></p> <p>Laercio Zambolim, UFV, Brazil</p>
11:45 - 12:10	<p><b>Invited Lecture: Innovation in agrochemical discovery and development</b></p> <p>Keiji Tanaka, Mitsui Chemicals Agro, Inc. Shiga, Japan</p>
12:10 - 12:35	<p><b>Special Lecture: Innovative approaches to development and introduction of reduced risk pesticides</b></p> <p>Kenneth D. Racke - Dow AgroSciences, Indianapolis, USA</p>
12:35 - 13:00	Discussion
10:30 - 13:00	<p>Poster Viewing - Section 1 Foyer – 4<sup>th</sup> Floor</p> <p>Theme 1. Innovative Chemistry and Technology for Crop Protection Chemistry</p> <p>Theme 2. Risk Assessment, Regulation and Global Harmonization</p> <p>Theme 5. Education and Information Management in Crop Protection</p>
13:00 - 14:30	Lunch (on your own)
14:30 - 14:55	<p>(Theme 2 – Risk Assessment, Regulation and Global Harmonization)</p> <p><b>Invited Lectures: Risk Assessment of Pesticide and GLP Program from INMETRO/Brazil</b></p> <p>Elisa Rosa dos Santos, DICLA-Laboratory Accreditation Division/CGCRE/INMETRO, Brazil</p>
14:55 - 15:20	<p><b>Invited Lectures: Joint evaluations as a mechanism for advancing international harmonization for the regulation of new active ingredients</b></p> <p>George Jeffrey Herndon, USEPA, Wahington, DC, USA</p>
15:20 - 15:45	<p><b>Invited Lectures: Efforts in residue chemistry harmonization: a crop protection industry perspective</b></p> <p>Volker Bornemman, Environmental and Consumer Safety, Agricultural Products Division, BASF Corporation, North Carolina, USA</p>
15:45 - 16:10	<p><b>Invited Lectures: Role of international treaties, conventions (POPs, PIC)</b></p> <p>Bernhard Johnen, CropLife International, Brussels, Belgium</p>
16:10 - 16:35	<p><b>Invited Lectures: Critical issues in a functional registration system based on "equivalence"</b></p> <p>Roman Macaya, Asociacion Latinoamericana de la Industria Nacional de Agroquimicos (ALINA), Cartago, COSTA RICA</p>
16:35 - 17:00	<b>Invited Lectures: Toxicological Evaluation of Pesticides</b>

	Ana Maria Vekic, ANVISA, BRAZIL
17:00 - 17:15	Coffee Break
17:15 - 19:15	<p style="text-align: center;"><b>Round Table:</b></p> <p>Industry propose to implement the Occupational Exposure and Risk Assessment in Brazil: PHED database, similarities between Brazilian and American GAPs, MOE (Margin of Exposure) approach, area treated per day definition</p> <p>Occupational risk assessment to pesticides: a tool into the regulatory process</p> <p style="text-align: center;">Monty Eberhart, Bayer CropScience, USA</p> <p>Monitoring and biomonitoring studies for occupational exposure to pesticide</p> <p style="text-align: center;">Leah Rosenheck, LR Risk Consulting, Inc., USA</p> <p>Risk Management of Occupational Exposure to pesticides</p> <p style="text-align: center;">Flavio A. D. Zambrone, Planitox, Brazil</p>

## WEDNESDAY, NOVEMBER 11th, 2009

Time	Theme / Lecturer
8:30 - 9:15	<p style="text-align: center;"><b>Plenary Lectures</b></p> <p style="text-align: center;">(Theme 4 – Pesticide Residues in Food and Human Exposure)</p> <p style="text-align: center;"><b>International approaches to evaluation of residues in food</b></p> <p style="text-align: center;">Caroline A. Harris, Exponent International Ltd., Harrogate, UK</p>
9:15 - 10:00	<p style="text-align: center;"><b>Pesticide dietary risk assessment in Brazil</b></p> <p style="text-align: center;">Eloisa Dutra Caldas, UnB, Brazil</p>
10:00 - 10:30	Coffee Break
10:30 - 10:55	<p style="text-align: center;"><b>Invited Lectures</b></p> <p style="text-align: center;"><b>Proposed approach for global residue programs</b></p> <p style="text-align: center;">Carmen Tiu, Dow AgroSciences Indianapolis, USA</p>
10:55 - 11:20	<p style="text-align: center;"><b>Residues in food, trade, MRL harmonization, and import tolerances</b></p> <p style="text-align: center;">Phillip Anthony Brindle, BASF Corporation, North Carolina, USA</p>
11:20 - 11:45	<p style="text-align: center;"><b>Pesticide residue monitoring program in Brazil</b></p> <p style="text-align: center;">Luiz Claudio Meirelles, ANVISA, Brazil</p>
11:45 - 12:10	<p style="text-align: center;"><b>Biodegradation of chemical pesticides as a strategy to residue treatment:</b></p> <p style="text-align: center;"><b>Experiences in Mexico</b></p> <p style="text-align: center;">Maria Laura Ortiz Hernández CEIB/UAEM, Morelos, Mexico</p>

<b>12:10 - 12:35</b>	<p align="center"><b>Monographs and Pesticide Import Control</b></p> <p align="center">Peter Rembischevski, GEATO/GGTOX, ANVISA, Brazil</p>
<b>10:30 - 13:00</b>	<p align="center">Poster Viewing - Section 2</p> <p align="center">Theme 3. Environmental Chemistry and Risk Assessment</p>
<b>13:00 - 14:30</b>	<p align="center">Lunch</p>
<b>14:30 - 14:55</b>	<p align="center">Invited Lectures</p> <p align="center">(Theme 4 – Pesticide Residues in Food and Human Exposure – section II)</p> <p align="center"><b>Advances in analysis of pesticide residues in food</b></p> <p align="center">Adelia Cristina Pessoa Araujo, Institute of Technology of Pernambuco (ITEP), Pesticide Residue Laboratory (LabTox), Recife, Brazil</p>
<b>14:55 - 15:20</b>	<p align="center"><b>Issues related to minor crops and residues in food</b></p> <p align="center">Luiz Eduardo Pacifici Rangel , General Coordinator for Pesticides, Ministry of Agriculture (MAPA), Brazil</p>
<b>15:20 - 15:45</b>	<p align="center"><b>Advances in methods of analysis for pesticides, prohibited materials and industrial chemicals in environmental matrices</b></p> <p align="center">Kevin L. Armbrust, Office of the State Chemist, Mississippi, USA</p>
<b>15:45 - 16:10</b>	<p align="center"><b>Conducting total diet surveys for pesticide exposure</b></p> <p align="center">Sue-Sun Wong, Eversing Co.Ltd, Tainan City, Taiwan</p>
<b>16:10 - 16:30</b>	<p align="center">Coffee Break</p>
<b>16:30 - 18:30</b>	<p align="center">Course (Part II)</p> <p align="center">Equivalence Process in Brazil</p> <p align="center">Ana Maria Vekic, Anvisa</p>
<b>16:30 - 18:30</b>	<p align="center">Round Table:</p> <p align="center">Potential Residue Problems for Crop Exports</p> <p align="center">Chairperson: Guilherme Luiz Gulmaraes, ANDEF, Brazil</p> <p align="center">Rapporteur: Carolline Harris, Exponent, UK</p> <p align="center">Laura Bernardi Bonomi, Argentina, Desaffos Para la exportacion a la Union Europea</p> <p align="center">Carmen Tiu, Dow AgroScience/CropLife America, USA</p> <p align="center">George Jeffrey Herndon, USEPA, Washington, DC, USA</p>

## THURSDAY, NOVEMBER 12th, 2009

Time	Theme / Lecturer
8:30 - 9:15	<p>Plenary Lectures (Theme 3 – Environmental Chemistry and Risk Assessment)</p> <p><b>Pesticides and protection of drinking water in the Netherlands</b></p> <p>Jan (Johannes) Linders, National Institute for public Health and the Environment, Bilthoven, The Netherlands</p>
9:15 - 10:00	<p>(Theme 5 – Education and information management in crop protection)</p> <p><b>E-evaluate pesticide ecological risk assessment and training module</b></p> <p>Ronald D. Parker, USEPA, Office of pesticide programs, Washington DC, USA</p>
10:00 - 10:30	Coffee Break
10:30 - 10:55	<p>Invited Lectures (Theme 3 – Environmental Chemistry and Risk Assessment)</p> <p><b>Estimating pesticide risks to non-target wildlife</b></p> <p>John Johnston, USDA, USA</p>
10:55 - 11:20	<p><b>Pesticide environmental assessment approaches</b></p> <p>Rafaela Maciel Rebelo, Brazillan Institute of Environment and renewable natural resources (IBAMA), Brasilia, Brazil</p>
11:20 - 11:45	<p><b>The emergence of environmental risk assessment in Latin America: an industry perspective</b></p> <p>Joseph J. Dulka, E.I. DuPont de Nemours, Inc., DuPont Crop Protection, Stine-Haskell Research Laboratory, Newark, USA</p>
11:45 - 12:10	<p><b>Ecotoxicological risks of glyphosate to frogs – a case study in Colombin</b></p> <p>Keith R. Solomon, Centre for Toxicology and Department of Environmental Biology, Univ. of Guelph, Canada</p>
12:10 - 12:35	<p><b>Pesticides in air: new challenges in agricultural air quality research</b></p> <p>Laura Lee McConnell, USDA/ARS, Environmental Management and Byproduct Utilization Laboratory, Beltsville, Maryland, USA</p>
12:35 - 13:00	<p><b>The ecological risk of vegetable production: mitigation strategies</b></p> <p>Cathleen J. Hapeman, USDA, USA</p>
10:30 - 13:00	Poster Viewing

	Theme 4. Pesticide Residues in Food and Human Exposure
13:00 – 14:30	Lecture High throughput Liquid Chromatography – Tandem Mass spectrometry in pesticide residues analysis by Applied biosystems do Brasil (Jose Lui da Costa, PhD, Field application specialist, Mass Spectrometry)
13:00 - 14:30	Lunch (on your own)
14:30 - 14:55	( Theme 5 – Education and information management in crop protection) <b>Global agrochemical information sources</b> John B. Unsworth, Consultant Scientist, Chelmsford, UK
14:55 - 15:20	<b>The role of E-learning in supporting analytical laboratories</b> Elizabeth Carazo, Centro de investigacion en contaminacion Ambiental (CICA) Uviversidad (Univ.) of Costa Rica, San Jose, Costa Rica
15:20 - 15:45	<b>Education and regulation in pesticide application</b> Luiz Cesar Pio/Herbicat, Brazil
15:45 - 16:10	<b>Actions of chemical industry for stewardship, including product quality</b> Jose Otavio Menten, Brazilian Crop Protection Association (ANDEF), Sao Paulo, Brazil
16:10 - 16:35	<b>Container management in Brazil – recalling and processing of empty pesticide containers</b> Mario Kazuchira Fujii, National iNsttute for processing empty Containers (inpEV), Sao Paulo, Brazil
16:35- 17:00	<b>Evolution of Personal protective equipments (PPEs) in Brazil</b> Hamilton Umberto Ramos, Envineering and Automation Centre, Agronoic Institute, IAC, Brazil
17:00	Closing Ceremony

## FRIDAY, NOVEMBER 13th, 2009

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Open for tours to research institutes, agricultural areas, etc...