

出國報告（出國類別：其他）

## 參加第 24 屆國際昆蟲學會議報告書

服務機關：農業委員會 農業試驗所

姓名職稱：助理研究員 張淑貞

派赴國家：韓國

出國期間：101 年 8 月 19 日至 101 年 8 月 25 日

報告日期：101 年 10 月 24 日

## 摘要

國際昆蟲學會議 (International Congress of Entomology) 為世界性昆蟲學界會議，每四年舉行一次，每次都會吸引世界各地數千名以上的昆蟲學者與會。今年會議主題為「New Era in Entomology」，揭示昆蟲學的新式代，及其在環境保育及生物多樣性、糧食安全及作物保護之相關應用。這次會議全球約有 2500 人與會，分別來自 97 個國家，共約 2700 篇論文。台灣也約有 60 人參加，共提出 67 篇論文。每天均進行一個共同的主題演講，其餘所有參與論文共分成 3 個方式發表，包括專題討論、口頭論文宣讀及壁報論文展示。其中專題討論再分成 17 個主題，口頭論文宣讀分成 7 個主題，分別在不同會議室同時進行討論。壁報論文則分批在專區展示，亦分成 7 個主題進行。本人於此會議中提出一篇沫蟬幾丁質酶相關研究之口頭論文宣讀。

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## 本文

### 壹、會議目的

國際昆蟲學會議 (International Congress of Entomology) 為世界性的昆蟲學界會議，每四年舉行一次，自 1910 年始至今已在世界各國舉行 23 屆，每次都會吸引世界各地數千名以上的昆蟲學者與會。今年第 24 屆會議在韓國大邱 (Daegu) 舉行，這是國際昆蟲學會會議首次在韓國舉行。這次會議全球約有 2500 人與會，分別來自 97 個國家，共約 2700 篇論文。台灣也約有 60 人參加，共提出 67 篇論文。每天均進行一個共同的專題演講，其餘所有參與論文共分成共分成 3 個方式發表，包括專題討論 (Symposium)、口頭 (Oral) 論文宣讀及壁報 (Poster) 論文展示。其中專題討論再分成 17 個主題，口頭論文宣讀分成 7 個主題，分別在不同會議室同時進行討論。壁報論文則統一分批在專區展示，亦分成 7 個主題進行。藉由此國際性會議之舉辦，提供各領域昆蟲學者討論、交流的機會，亦擴大各研究學者視野，有助提升昆蟲研究水平。本人於此會議中提出一篇沫蟬幾丁質酶相關研究之口頭論文宣讀，題目及摘要詳見附錄一。

### 貳、會議過程

國際昆蟲學會議每四年舉辦一次，本次為第 24 屆會議，由 2012 年 8 月 19 日到 25 日在韓國大邱舉行，韓國昆蟲學會理事長 Dr. Kim 在 2011 年即已至台灣敬致歡迎與會之意。台灣此次約有 60 人參加，參加成員包括中興、台大、彰師大等學校老師、學生，及中研院、農試所等研究機構研究人員。因參加人數眾多，故台灣昆蟲學會行前即已統一聯繫相關交通問題，由中興大學戴淑美老師協調眾人一起前往，節省不少機票費用；住宿則因會場附近大型旅館皆已由大會承攬，所以各人自行與大會聯絡協調住宿問題。

會議會場在大邱的 Exco 會議中心，此會議中心佔地廣闊達 24000 平方公尺，擁有 34 間會議室，大樓外部立有明顯往返附近各大旅館的巡迴車站牌，交通方

便。會議中心隔著馬路對面對面即是一 5 星級旅館，但因各國參加人數眾多，很快就客滿，我們只訂到離會場約 20 分鐘的旅館，

國際昆蟲學會議議程自 8 月 19 日到 25 日，詳如附錄二，我們一行人在 8 月 19 日抵達韓國。註冊領取資料後，隨即展開會議行程。因參與論文多達 2000 多篇，所以大會並沒有印出論文摘要，只在議程本附上論文題目，另提供一份議程光碟，裝在電腦上後可輸入關鍵字搜尋相關論文題目、摘要及宣讀時間，方便參與議程討論，搜尋功能良好，已帶回本所與同仁分享。

會議每日早上 8 點至 9 點皆有一個專題演講，分別邀請不同國家、在昆蟲各領域有特殊成就的研究人員進行專題深入的探討，專題演講人員及題目如附錄三。其餘時間從上午 9 點至下午 5 點 30 分都各安排有不同專題及口頭論文宣讀議程，壁報論文展示則統一在會場 3 樓大廳。這次會議全球約有 2500 人與會，分別來自 97 個國家，共約 2700 篇論文，論文中列為作者的有 5800 位，專題論文有 1262 篇，口頭論文宣讀有 487 篇。壁報論文有 946 篇，因篇數眾多，故將所有壁報論文分成 2 批展示。台灣也約有 60 人參加，共提出 67 篇論文。會場 3 樓大廳另有一區提供各國昆蟲學會、廠商展示。下一屆國際昆蟲學會議將在美國佛羅里達州舉行。

本人於此會議中提出一篇沫蟬幾丁質酶相關研究之口頭論文宣讀，論文排在昆蟲生理發育方面的議程，此議程有 22 篇論文，本人論文排在 8 月 24 日上午第一段議程。本人於議程中提出近來我們在沫蟬幾丁質酶此酵素之發現、其 cDNA 全長解序及其在沫蟬各組織的表現差異初步觀察。會中 Dr. Kim 對於此基因在沫蟬各組織的表現差異結果提出一些建議，我們回國後也將會就這部分做各進一步的研究。

### **參、會議心得及建議事項**

這次國際昆蟲學會議吸引全球兩千多名昆蟲學者參加，加上伴隨的眷屬，短期來說，整體帶來的旅館、餐飲、旅遊、交通利益驚人。長期來說，可擴展韓國

國際知名度、提升韓國當地學者視野，向國際各界展現韓國文化，並可提升當地民眾與國際接軌的能力。舉辦國際會議實是一個國家快速躍升國際級都市的方法，也值得我們國家多爭取此類機會。此次在韓國舉辦的國際昆蟲學會議，會議會場在大邱的 Exco 會議中心，大邱近年來著力發展為國際會議都市，Exco 會議中心佔地廣闊達，大樓外部立有明顯往返附近各大旅館的巡迴車站牌，標識清楚、交通方便。會場附近餐廳林立，可惜英語並不普及，很多招牌只有韓文標識，大邱要發展為國際會議都市軟體方面還有努力空間。會議中心隔著馬路對面對面即是一 5 星級旅館，但因各國參加人數眾多，很快就客滿，另因考慮聯繫方便，台灣學者盡量同住一間旅館，所以大多訂離會場約 20 分鐘的 Hotel Inter-Burgo Daegu 旅館。不過因會場往返附近各大旅館的巡迴車方便，每日早上 7:20~8:30 皆有約 4 班車從旅館開出，傍晚 17:50~18:20 約有 2 班車從會場開回旅館，所以交通還算方便，但因旅館位處郊區，餐飲較不方便。會場、旅館附近的交通、餐飲問題，是我們國家未來舉辦國際會議時的重點解決議題。

另外此次國際昆蟲學會議主題是「新世代昆蟲學」，會議中展現多項應用在昆蟲研究上的新技術。其中 RNA 干擾技術在害蟲防治上的應用前景最是吸引我等的目光，此技術原只應用於基因功能的研究一藉由阻斷蛋白質表現，確認基因功能，是人類疾病治療上很熱門的研究主題。此技術原本因為需將雙股 RNA 注射入昆蟲體內，才可以引發 RNA 干擾效果，無法直接應用於害蟲防治，但在此次會議上已有多篇報告提出可將雙股 RNA 直接噴佈在在植物葉面上，昆蟲取食汁液後亦可達到 RNA 干擾效果，或是噴佈在昆蟲體表，雙股 RNA 亦可進入昆蟲體內達到 RNA 干擾效果、致死昆蟲。這些發現頗為振奮人心，而因 RNA 干擾有基因專一性，對其他非目標生物相對安全，故而甚至有學者直接指出 RNA 干擾是最新一代的殺蟲劑新星。本人近年來在昆蟲幾丁質酶基因亦以進行了一系列的研究，RNA 干擾技術提供了此系列研究的另一個應用可能性。

## 肆、附錄

### 一、口頭宣讀論文摘要

Insect Immunology, Physiology and Neurobiology

AF2220

Molecular cloning of chitinase cDNA from the spittlebug *Poophilus costalis*  
(Hemiptera: Cercopoidea: Aphrophoridae)

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The spittlebug nymphs feed on plant sap and produce forth to cover their fragile bodies. In this study, we have confirmed the fungicidal effect of the froth of the spittlebug *Poophilus costalis* by bioassay on the pea wilt pathogen, *Fusarium oxysporum* f. sp. *pisi*; in addition, the activities of  $\beta$ -N-actylglucosaminidase, chitobiosidase and endochitinase were observed in the froth. Furthermore, a chitinase cDNA, named *PCChi*, was cloned from the Malpighian tubules of *P. costalis* nymphs. The *PCChi* cDNA contains an 1809-nucleotide open reading frame encoding a protein of 603 amino acids with an estimated molecular weight of 68 kDa. The deduced amino acid sequence of *PCChi* has 58-86% identities to known chitinases in the other species.

Keywords: *Poophilus costalis*, spittlebug, chitinase, molecular cloning

## 二、國際昆蟲學會議流程

Time	Aug.19 (Sun)	Aug.20 (Mon)	Aug.21 (Tue)	Aug.22 (Wed)	Aug.23 (Thu)	Aug.24 (Fri)	Aug.25 (Sat)
		Exhibition					
08:00~09:00		Plenary Session1	Plenary Session2	Plenary Session3	Plenary Session4	Plenary Session5	
09:00~10:30		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation	
10:30~11:00		Coffee Break					
11:00~12:30		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation	
12:30~14:00	Registration	Lunch & Poster Session					
14:00~15:30		Oral Presentation	Oral Presentation	Special Program	Oral Presentation	Oral Presentation	Post Tour
15:30~16:00		Coffee Break			Coffee Break		
16:00~17:30		Oral Presentation	Oral Presentation		Oral Presentation	Oral Presentation	
17:30~18:00							
18:00~19:30	Opening Ceremony & ...	Interest Group Meetings	Interest Group Meetings	Gala Dinner	Interest Group Meetings	Closing Ceremony & Farewell ...	



### 三、國際昆蟲年會專題演講人員及題目

#### Opening Ceremony (Aug.19)

#### Wigglesworth Memorial Lecture



- **Stephen Simpson, Australia**
- **Organization** : School of Biological Science, University of Sydney
- **Position** : Professor
- **Research area** : A Tale of Swarms, Cannibals, Obesity and Ageing
- **Presentation Title** : From individuals to populations: a tale of swarms, cannibals, ageing and human obesity

#### Plenary Session 1 (Aug.20)



- **Takema Fukatsu, Japan**
- **Organization** : National Institute of Advanced Industrial Biology and Technology
- **Position** : Group Leader, Professor
- **Research area** : Symbiotic Evolution and Biological Functions
- **Presentation Title** : Biodiversity, Symbiosis and Evolution

#### Plenary Session 2 (Aug.21)



- **Thomas W. Scott, USA**
- **Organization** : Department of Entomology, University of California, Mosquito Research Laboratory

- **Position :** Professor, Director
- **Research area :** Epidemiology and prevention mosquito-borne disease
- **Presentation Title :** Pathogen transmission dynamics at the human-mosquito interface

### Plenary Session 3 (Aug.22)



- **Ilkka Hanski, Finland**
- **Organization :** Department of Biological and Environmental Sciences, University of Helsinki
- **Position :** Professor
- **Research area :** Insect Biodiversity and its Conservation in Fragmented Landscapes
- **Presentation Title :** Habitat loss and fragmentation – What happens to insect populations and species?

### Plenary Session 4 (Aug.23)



- **Christian Borgemeister**
- **Organization :** International Centre of Insect Physiology and Ecology
- **Position :** Director General and CEO
- **Research area :** Entomology for poverty alleviation
- **Presentation Title :** Insect science and poverty alleviation – tales from Africa

### Plenary Session 5 (Aug.24)



- **Kongming Wu, China**
- **Organization :** Institute of Plant Protection, Chinese Academy of Agricultural Sciences
- **Position :** Director Professor

- **Research area :** Area-wide Integrated Pest Management Strategy in Bt Cotton Agro ecosystem
- **Presentation Title :** Ecological Succession of Insect Populations in Bt cotton agroecosystem: a Case Analysis in China

#### 四、國際昆蟲學會議議程主題

##### **A. Symposium**

1. Systematics, Phylogeny and Zoogeography
2. Morphology and Ultrastructure
3. Insect Immunology, Physiology and Neurobiology
4. Development and Reproduction
5. Genetics, Genomics and Evolutionary Entomology
6. Behavior and Chemical Ecology
7. Insect related Interactions at a Multi-trophic Ecosystem
8. Pesticides, GM Crops, Resistance and Toxicology
9. Conservation, Biodiversity and Climate Change
10. Integrated Pest Management
11. Insect Biological Control
12. Urban, Stored Product and Post Harvest Entomology
13. Medical & Veterinary Entomology
14. Invasive Species and Quarantine
15. Acarology
16. Social Insects
17. Special Issues

##### **B. General-Oral**

1. Taxonomy
2. Physiology
3. Ecology
4. IPM
5. Pathology & Microbial
6. Medical Entomology
7. Entomology General

##### **C. General-poster**

- 8/20(Mon)~ 8/22(Wed): Taxonomy, Physiology, and Ecology
- 8/23(Thurs)~8/24(Fri): IPM, Pathology, Medical Entomology, and Others

## 五、相關會議照片



論文宣讀會場

### Promoting Insect resources as a new type of future-oriented agro-food industry

곤충을 새로운 미래 농식품산업으로 육성

In 2011, the Ministry for Food, Agriculture, Forestry and Fisheries planned an entomological survey to uncover beneficial insects, for Insect R&D, and offer support for Insect farmhouses with the aim of stimulating insect industry as a new type of future-oriented agro-food industry.  
농림수산식품부는 2011년 곤충을 새로운 미래 농식품산업으로 육성하기 위한 곤충조사, 유용 곤충 발굴, R&D 및 곤충농가 육성지원 등을 계획하였다

## 5-Year Master Plan for Industrial Promotion of Insect resources (2011-2015)

곤충산업육성 5개년 종합계획

#### Survey of Insect Resources and Uncovering of Beneficial Insects

**곤충자원 조사 및 유용곤충의 발굴**

1. Survey on distribution and habitat of insect resources
  - Check-up of current distribution and habitat of insect insects nationwide and launch of an ongoing monitoring system
  - Database creation and utilization including distribution, ecology, and resource utilization of insect insects
2. Expeditions to discover the collection, specimens, and preservation of insect resources
  - Collection of 53,000 insect specimens and database construction across 10,000 insect samples
  - Technological development of genetic analysis of insect resources
3. Insect resource evaluation and uncovering of beneficial insects
  - Selection of top species through evaluation of beneficial insects and constant development of breeding and cultivation technologies

1. 곤충자원의 분포 조사 및 서식환경조사  
- 전국 곤충 분포를 파악하고, 서식환경 파악 및 지속적인 모니터링 체계 구축  
- 전국 곤충의 분포, 생태적 특성 및 서식환경을 조사하여 데이터베이스 구축

2. 곤충자원의 수집, 보존 및 육종기술 개발  
- 곤충자원의 수집, 보존, 육종 기술 개발을 통한 53,000건 이상 곤충자원의 확보  
- 곤충자원의 유전자 분석 기술 개발을 통한 유전자 분석 기술 개발

3. 곤충의 가치 평가 및 유용곤충 발굴  
- 유익곤충의 특성 파악을 통한 유종 개발 및 서식지인 양묘장 기술 개발

#### Training and Education of Professional Manpower

**전문인력 양성 및 교육강화**

1. Dissemination and expansion of educational training centers for insect resources
  - Select entomology-related universities, associations, and institutes as specialized training centers
  - Support systematic education program for cultivation of entomological experts
2. University of Insect-related educational courses and monitoring
  - Insect education courses run by educational facilities under the Training Institute for Food, Agriculture and Fisheries, Rural Development Administration, and Korea's Farm Service
  - Educational curriculum including the insect industry's policy direction, insect breeding technology, and field practice

1. 곤충산업 전문인력양성기관 지원 및 운영  
- 곤충산업 관련 대학, 연구소를 전문인력양성기관으로 지정 지원  
- 곤충산업 전문인력양성 지원 체계 구축을 통한 전문인력 양성 지원

2. 곤충산업교육과정 개발 지원 추진  
- 농림수산식품부, 농림수산식품교육연계사업, 농림수산식품교육연계사업 지원  
- 곤충산업 정책방향, 교육내용, 현장실용 등 교육 지원

#### Commercialization and R&D Reinforcement of Insect Resources

**곤충자원의 상품화 R&D 강화**

1. Development and diffusion of new insect species for insect pests for education
  - Exploration and selection of various insect species for natural observation, pets, local festivals, etc.
2. Physiological and adding R&D for utilization of insect resources available for health and medicine
  - Research and development of insect resources available for health and medicine

#### Promotion of Insect Farmhouses and Businesses

**곤충농가 및 곤충 산업체 육성**

1. Modernization and specialization of insect production complex and experimental training center
  - Support program for building an insect production complex and an experimental training center
  - Pilot program for fecal decomposition technology using *Stratiomyidae*
2. Review of local support center commission for industrialization of insect resources
  - Review of local support center commission for industrialization of insect resources

韓國未來 5 年昆蟲資源發展



韓國稻米展售



蜜蜂相關產品展售



寵物用昆蟲食品



植物萃取物及微生物殺蟲、殺蟎劑



以瓢蟲控制白粉病