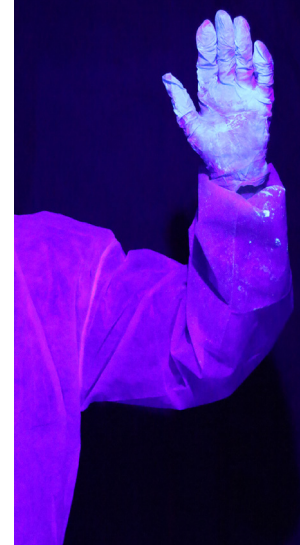


*President: Prof. Christine Foyer, BSc, PhD*

# **International Advances in Pesticide Application**



A three day conference  
at the Chamber of Agriculture, North Rhine  
Westphalia, Germany  
on 25-27 January 2022

## **ANNOUNCEMENT & CALL FOR PAPERS**

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# International Advances in Pesticide Application

on 25-27 January 2022

at the Chamber of Agriculture, North Rhine Westphalia, Germany

**Deadline for submission of full manuscripts (all papers and posters) for publication is 30 September 2021**

Over the last three decades the Association of Applied Biologists, Pesticide Application Group has provided a forum for researchers and practitioners from around the world to present and discuss progress with the development of pesticide application technology. During this time great advances have been made to improve the efficacy and safety of pesticides, resulting in lower doses of pesticides in the field, leading to lower residue levels in produce and the environment. Scientific and engineering advances can be exploited more readily with regular contact between the many research groups, and commercial organisations working with crop protection techniques.

Once again it is anticipated there will be a wide range of international papers presented at the 2022 conference emphasizing the excellent research being done across the diverse disciplines to improve application techniques and pesticide safety. All papers will be published in *The Aspects of Applied Biology*, which acts as a good reference source for up to date techniques for researchers around the globe.

The *Aspects of Applied Biology* series for these conferences are welcomed by the delegates and sell well for the Association. The most recent four volumes have been printed in colour and delegates felt it was well worth the extra cost for this.

## PROVISIONAL PROGRAMME (BASIS points have been applied for)

### Tuesday 25 January

#### 09:15 Welcome

TOM ROBINSON (Tom Robinson Sprays, Cambridge, UK/Pesticide Application Group Convener)

#### Session 1: Training

Session Organiser: PAULO BALSARI (University of Turin, Italy)

#### 09:30 INNOSETA regional workshops: analysis of the needs for better dissemination of spraying innovations in the field

S CODIS, E HUGO (Institut Français de la Vigne et du Vin, France), E GIL (Universitat Politècnica de Catalunya, Spain), F GIOELLI, P BALSARI (DISAFA Università degli Studi di Torino, Italy), A KOUTSOURIS (Agricultural University of Athens, Greece), D NUYTTENS (ILVO Flanders Research Institute for Agriculture, Fisheries and Food, Belgium), S FOUNTAS, M KOUTSIARAS (Agricultural University of Athens, Greece), Z TSIROPOULOS (AGENSO Agricultural & Environmental Solutions, Greece), D DONKERS (ZLTO - Agri Food Health Innovation Centre, Netherlands), & E NILSSON (Visavi God Lantmannased AB, Sweden)

#### 09:50 Best management practices to keep pesticides out of water from point sources. Online self assessment and training tool

M ROETTELE (BetterDecisions, Kandern, Germany), P BALSARI (DISAFA Università degli Studi di Torino, Italy), G DORUCHOWSKI (INHORT, Skierniewice, Poland), J DYSON (Syngenta, Basel, Switzerland), E GIL (UPC Universitat Politècnica de Catalunya, Spain), M KICINSKI (CropLife Europe, Brussels, Belgium), M LESNIK (University of Maribor, Maribor, Slovenia), V LAABS (BASE, Limburgerhof, Germany), P MARUCCO (DISAFA Università degli Studi di Torino, Italy), E PAUWELYN (Inagro, Rumbeke, Belgium) & O RANTA (USAMV Cluj Napoca, Romania)



10:10 **Life Farm, Fresh Fruit - Effects of operator training and sprayer adjustments on agronomic inputs**  
L T BERGER, E UKHANDEEVA, F ANDREU (Pulverizadores Fede S.L., Spain), J C CAÑAVERAS SANCHEZ, P CARAPINHA (Elaia Monte do Outeiro, S.A., Portugal), & J M AYUSO RODRÍGUEZ (Viñas del Vero SAU, Spain)

10:30 **The INNOSETA Platform: a web-tool to support dissemination of innovation and research in the crop protection sector**  
E MOZZANINI, F GIOELLI, P MARUCCO, M GRELLA (DISAFA, Università degli Studi di Torino, Italy), D NUYTTENS (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium), E GIL (UPC Universitat Politècnica de Catalunya, Spain), S CODIS (Institut Français de la Vigne et du Vin, France), Z TSIROPOULOS, P STAMATELOPOULOS (AGENSO, Greece), E NILSSON (Visavi God Lantmannased AB, Sweden) & P BALSARI (DISAFA, Università degli Studi di Torino, Italy)

10:50 **COFFEE**

*Session 2: Testing*

Session Organiser: JAN VAN DE ZANDE (Wageningen University and Research, the Netherlands)

11:20 **The performance of automatic spray boom height control systems**  
A HERBST (Julius-Kühn-Institut, Braunschweig, Germany)

11:40 **Pulse width modulation: effect of duty cycle on nozzle flow rate and droplet characteristics**  
I ZWERTVAEGHER (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium), S FOUNTAS, N MYLONAS (Agricultural University of Athens, Greece), P BALSARI, M GRELLA, P MARUCCO (DISAFA, Università degli Studi di Torino, Italy), A CAFFINI (CAFFINI, Italy), & D NUYTTENS (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium)

12:00 **Assessment of the influence of the nozzle's pattern and spray distance on vertical spray profile**  
E GIL (UPC Universitat Politècnica de Catalunya, Spain)

*Session 3: Decision Support Systems*

Session Organiser: RICHARD GLASS (CHAP Solutions, National Agri-Food Innovation Campus, York, UK)

12:20 **A web based decision tool to optimise the configuration of sprayers for citrus tree pesticide applications**  
C GARCERA, E MOLTÓ, H IZQUIERDO (Centro de Agroingeniería, Instituto Valenciano de Investigaciones Agrarias (IVIA), Valencia, Spain), P BALSARI, P MARUCCO, M GRELLA (DISAFA Università degli Studi di Torino, Italy) & P CHUECA (Centro de Agroingeniería, Instituto Valenciano de Investigaciones Agrarias (IVIA), Valencia, Spain)

12:40 **Zone-Selective plant protection based on AI pest early detection**  
L T BERGER (Pulverizadores Fede S.L., Spain), G POLDER, Z TSIROPOULOS (Agricultural & Environmental Solutions, Greece), E GIL (UPC, Universitat Politècnica de Catalunya, Spain), P M BLOK (Agro Food Robotics, Wageningen University & Research, the Netherlands), P ORTEGA (UPC, Universitat Politècnica de Catalunya, Spain) & P STAMATELOPOULOS (Agricultural & Environmental Solutions, Greece)

13:00 **LUNCH**

*Session 4: Modelling*

Session Organiser: CLARE BUTLER ELLIS (Silsoe Spray Applications Unit, Bedford, UK)

- 14:00 **Probabilistic risk assessment for watercourses exposed to spray drift in the Netherlands**  
H JAN HOLTERMAN & JAN VAN DE ZANDE (Wageningen University and Research, The Netherlands)
- 14:20 **CFD dust drift simulation from sugar beet seed drilling: explicit modelling of machine types**  
M A ADAMU (BIOSYST-MeBioS, KU Leuven, Belgium), DAVID NUYTTENS, R GODAERT (ILVO Flanders Research Institute for Agriculture, Fisheries and Food, Belgium), N JONES, A C CHAPPLE, B JENE (Seed Treatment Industry Stewardship Steering Committee (STISSC) on behalf of its members: Syngenta Crop Protection AG, Bayer AG, DuPont Crop Protection, BASF SE and Nufarm GmbH & Co. KG), BART NICOLAI (BIOSYST-MeBioS, KU Leuven, Belgium), BRUNO SORNIN (Seed Treatment Industry Stewardship Steering Committee (STISSC) on behalf of its members: Syngenta Crop Protection AG, Bayer AG, DuPont Crop Protection, BASF SE and Nufarm GmbH & Co. KG) & PIETER VERBOVEN (BIOSYST-MeBioS, KU Leuven, Belgium)
- 14:40 **A mechanistic arable crop spray deposition model**  
E CASANOVA, N PAI (Bayer US Crop Science, St Louis, USA), A C CHAPPLE & Z GAO (Bayer AG, Crop Science Division, Monheim, Germany)

*Session 5: Drones*

Session Organiser: SIMON COOPER (Harper Adams University, Edgmond, UK)

- 15:00 **Characterization of the spray distribution of Unmanned Aerial Spray Systems (UASS) and the development of turnkey systems for vector control**  
J BONDS (Bonds Consulting Group, Florida, USA)
- 15:20 **Drift, deposition uniformity and swath width of two drone models according to the flight height**  
U R ANTUNIASSI (Sao Paulo State University, UNESP, Botucatu, SP, Brazil), R G CHECHETTO, A A B MOTA, F K CARVALHO (AgroEfetiva, Botucatu, SP, Brazil), I F BORGES (Corteva Agriscience, Barueri, SP, Brazil), J F MAGGION (Sao Paulo State University, UNESP, Botucatu, SP, Brazil) & P I T SILVA (Corteva Agriscience, Barueri, SP, Brazil)
- 15:40 **TEA**

**POSTERS**

Session Organisers: BEN MAGRI & JAMES THOMAS (Syngenta, Cambridge, UK)

- 16:10 **Spray application in partially closed high tunnels to manage drift in strawberry cultivation**  
D BONDESAN, G GANARIN & C RIZZI (Technology Transfer Centre, Edmund Mach Foundation, S Michele all'Adige (TN), Italy)
- 16:17 **Precision Orchard Dosing project: Development of a drone based crop measurement system for apples**  
O HILBOURNE & J MCDOUGALL (Outfield Technologies Ltd, Cambs, UK)
- 16:24 **Web based decision tool for drift mitigation in citrus pesticide applications**  
G CRUZ, MOLTÓ ENRIQUE (Instituto Valenciano de Investigaciones Agrarias (IVIA), Valencia, Spain), M ROETTELE (BetterDecisions, Kandern, Germany), P BALSARI, P MARUCCO (DISAFA Università degli Studi di Torino, Italy) & P CHUECA (Instituto Valenciano de Investigaciones Agrarias (IVIA), Valencia, Spain)

- 16:31 **Cotton regrowth control using different herbicides**  
G A PELEGRINI, C Â MARIANO DOS SANTOS, F GRIESANG, L BIANCO DE CARVALHO & MARCELO DA COSTA FERREIRA (São Paulo State University, Jaboticabal, São Paulo, Brazil)
- 16:38 **Considerations, summary and conclusions from 20 years of mandatory sprayer investigations in Poland**  
Z CZACZYK, J KRÓL, H NAGENGAST, ALANKIEWICZ (Poznań University of Life Sciences, Poland)
- 16:45 **The WUR Drift Calculator for estimating downwind deposits of spray drift**  
H J HOLTERMAN & J VAN DE ZANDE (Wageningen University and Research, The Netherlands)
- 17:00 **POSTER SESSION & WINE RECEPTION**
- 18:00 **END OF SESSION**
- 19:30 **DINNER**

### **Wednesday 25 January**

#### *Session 6a: Precision Application*

Session Organisers: BEN MAGRI & JAMES THOMAS (Syngenta, Cambridge, UK)

- 09:00 **Optimization of spray application on bed-grown vegetables. On-going developments within the OPTIMA project**  
J P DOUZALS (INRAE UMR ITAP, Université de Montpellier, France), S FOUNTAS, L ATHANASAKOS, N MYLONAS (Agricultural University of Athens, Greece), A LAMARE (INRAE UMR ITAP, Université de Montpellier, France), I ZWERTVAEGHER, D NUYTENS (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium), P BALSARI, P MARUCCO, M GRELLA (DISAFA, Università degli Studi di Torino, Italy) & A CAFFINI (CAFFINI, Italy)
- 09:20 **Verification and accuracy of a task-map based variable rate boom sprayer**  
J C VAN DE ZANDE, D C DE HOOG, J M G P MICHELSEN, M SNOUSSI, H STALLINGA & F SIJBRANDIJ (Wageningen University and Research, The Netherlands)
- 09:40 **Foliar deposition and off-target loss in young apple orchard with PWM-controlled spray systems**  
H ZHU (USDA-ARS Application Technology Research Unit, Ohio, USA), E OZKAN, R SALCEDO (The Ohio State University, Columbus, USA) & D FALCHIERI (Davide Falchieri Innovation in Crop Protection, Bologna, Italy)
- 10:00 *Invited speaker*  
**Farmer experience and field trials with pulse width modulation on an arable farm**  
S WOODS (G H Dean & Co., Kent, UK)
- 10:40 **COFFEE**

#### *Session 6b: Precision Application (cont'd)*

Session Organisers: BEN MAGRI & JAMES THOMAS (Syngenta, Cambridge, UK)

- 11:10 **Smart orchard sprayer to adjust pesticide dose to canopy characteristics**  
E GIL, B SALAS (UPC Universitat Politècnica de Catalunya, Spain) & L T BERGER  
(Pulverizadores Fede S.L., Spain)
- 11:30 **Evaluation of a single tree precision map- and sensor-based orchard sprayer**  
J C VAN DE ZANDE, D C DE HOOG, J M G P MICHELSEN, M SNOUSSI,  
H STALLINGA, P VAN DALFSEN, P F DE JONG & M WENNEKER (Wageningen University  
and Research, The Netherlands)
- 11:50 **Sensor-based spray traceability in vineyards**  
C ROMÁN & S PLANAS (University of Lleida - Agrotecnio CERCA Centre, Spain)
- 12:10 **Precision orchard dosing project: Development of a high precision variable rate spray system  
in tree fruit orchards**  
E C WHITFIELD, J CROSS (NIAB East Malling Research, Kent, UK), R SAUNDERS (H L  
Hutchinsons Ltd, Cambs, UK), O HILBOURNE, J MCDOUGALL (Outfield Technologies Ltd,  
Cambs, UK), S STAMPER (The Acclaimed Software Company Ltd, Norfolk, UK), N SEYMOUR  
(N P Seymour Ltd, Kent, UK) & C ELWORTHY (Plumford Farm Ltd, Kent, UK)
- 12:30 **Development of a smart sprayer for vineyards: first experimental results using PWM spray  
system**  
P MARUCCO (DISAFA Università degli Studi di Torino, Italy)
- 12:50 **LUNCH**

*Session 7: Loading and Cleaning*

*Session Organiser:* JAMES THOMAS (Syngenta, Cambridge, UK)

- 13:50 **Review of ISO 21191 Closed transfer systems performance specifications**  
N WESTCOTT (GoatThroat Pumps, Milford, USA), & J LANGENAKENS (AAMS, Maldegem,  
Belgium)
- 14:10 **Automatic, closed transfer loading and pre-mixing station for spray drones**  
J HERFORT, M ZIERMANN (Agrotop GmbH, Obertraubling, Germany), H-P SCHWARTZ,  
R KEICHER & K-U BARTSCH (Hochschule Geisenheim University, Germany)
- 14:30 **New closed loop knapsack sprayer system for sustainable smallholder farming**  
ANDY COOK, PHILIPP HABERSTROH, RÜDIGER KOTZIAN, GRAHAM SANDERSON  
& NAN XU (Syngenta Crop Protection AG, Basel, Switzerland)

*Session 8: Innovation*

*Session Organiser:* E GIL (UPC, Universitat Politècnica de Catalunya, Spain)

- 14:50 **Development of precision chemical application technology and equipment in China**  
X HE (China Agricultural University, Beijing, China)
- 15:10 **Electrohydrodynamic Spraying for Precision Weeding in Lettuce Fields**  
L ELSTONE, B GRIEVE, W HEATH (The University of Manchester, UK),  
S CALDWELL & PHILIP WEGE (Syngenta, Jealott's Hill International Research Centre,  
Bracknell, UK)
- 15:30 **TEA**
- 16:00 **Dynamic flow control for agricultural chemical application**  
D K GILES (University of California, Davis, USA)

**16:20 Realising crop protection on an Autonomous farm**

J GILL, K FRANKLIN & S E COOPER (Harper Adams University, Edgmond, UK)

**16:40 Robodock: a practical solution to pernicious weeds in pastures**

T EVANS, D R WHITE & S E COOPER (Harper Adams University, Edgmond, UK)

**17:00 Fan airflow setting in vineyards spray applications: first field tests for the development of the OPTIMA smart sprayer**

M GRELLA, F GIOELLI, P MARUCCO, E MOZZANINI (DISAFA, Università degli Studi di Torino, Italy), A CAFFINI (CAFFINI, Italy), D NUYTTENS, I ZWERTVAEGHER (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium), S FOUNTAS, N MYLONAS (Agricultural University of Athens, Greece) & P BALSARI (DISAFA, Università degli Studi di Torino, Italy)

17:20 END OF SESSION

20:00 CONFERENCE DINNER

**Thursday 26 January**

**09:00 AAB Pesticide Application Group AGM**

TOM ROBINSON (Pesticide Application Group Convener)

*Session 9: Targeted deposition*

Session Organiser: DAVID NUYTTENS (ILVO Flanders Research Institute for Agriculture, Fisheries & Food, Belgium)

**09:20 The performance of four individual nozzle configurations on the deposition of a soil applied herbicide**

T H ROBINSON (Tom Robinson Sprays, Cambridge, UK) & C MOUNTFORD-SMITH (BASF Agricultural Solutions, Cheadle Hulme, UK)

**09:40 Application methods for *Sphenophorus levis* VAURIE, 1978 (Coleoptera: Curculionidae) control in sugarcane**

P H URACH FERREIRA & M DA COSTA FERREIRA (São Paulo State University (UNESP), Jaboticabal, SP, Brazil)

**10:00 Two years of efficacy testing, assessment of deposition, drift, and system optimization efforts in the development of solid set canopy deposition systems**

K KOONTER, M GRIESHOP & M LEDEBUHR (Michigan State University, Clarksville, USA)

**10:20 New method to increase deposition: Copper microencapsulation**

P ORTEGA, E SANCHEZ (UPC Universitat Politècnica de Catalunya, Spain), B TYLKOWSKI, M OLKIEWICZ, J M MONTORNES (EURECAT, Spain) & E GIL (UPC Universitat Politècnica

10:40 COFFEE

*Session 10: Drift*

Session Organiser: COLIN MOUNTFORD-SMITH (BASF Agricultural Solutions, Cheadle Hulme, UK)

- 11:10 **How application volume influences non-target exposures to spray drift**  
C BUTLER ELLIS, ANDREW LANE, CHRISTINE O’SULLIVAN (Silsoe Spray Applications Unit Ltd, Bedford, UK) & JENNY BAUMANN (Bayer AG, Human Safety Assessment & Strategy, Monheim, Germany)
- 11:30 **A combined experimental and modelling study of dust drift during wheat sowing**  
D NUYTENS, R GODAERT (ILVO Flanders Research Institute for Agriculture, Fisheries and Food, Belgium), M A ADAMU (BIOSYST-MeBioS, KU Leuven, Belgium), C BUTLER ELLIS (Silsoe Spray Applications Unit Ltd, Bedford, UK), N JONES (ARVALIS Boigneville, France), A C CHAPPLE, B JENE, B SORNIN (Seed Treatment Industry Stewardship Steering Committee (STISSC) on behalf of its members: Syngenta Crop Protection AG, Bayer AG, DuPont Crop Protection, BASF SE and Nufarm GmbH & Co. KG) & P VERBOVEN (BIOSYST-MeBioS, KU Leuven, Belgium)
- 11:50 **How to conciliate application of plant protection products and protection of bystanders?**  
C BEDOS (INRAE Thierval-Grignon, France), J P DOUZALS (INRAE Montpellier, France), Y HUDEBINE (CTIFL Lanxade, France), B PERRIOT (ARVALIS Boigneville, France), M SELLAM (ACTA Paris, France), A VERGES (IFV Montpellier, France) & F VERPONT (CTIFL Lanxade, France)
- 12:10 **Optimising spray coverage on leaves and fruit in California strawberry crops using sprays with and without electrostatic charge and air movement by ground and unmanned aerial application platforms**  
A HEWITT (The University of Queensland, Gatton, QLD, Australia), C O’DONNELL (William Reynolds, Leading Edge, FL, USA) & Z CZACZYK (Poznań University of Life Sciences, Poland)
- 12:30 **Analysis and experiment on the droplet deposition of leaf-tip preference in pesticide application**  
X HE, Z WANG, C ZHENG & T LI (China Agricultural University, Beijing, China)
- 12:50 **CLOSING REMARKS**
- 13:00 **LUNCH**
- 13:30 **DEPARTURE**



# Per Gummer Andersen Award

**The Per Gummer Andersen award is open to early career scientists to enable them to attend the IAPA2022 conference. The award is up to £1000 towards conference registration, accommodation and travel. Applicants should apply for this award by sending a copy of their curriculum vitae and a letter stating “why you think the award should be presented to them” to Tom Robinson at [tom@tomrobinsonsprays.co.uk](mailto:tom@tomrobinsonsprays.co.uk) by **30 September 2021**. The successful candidate will be informed of the committee’s decision by 15 October 2021.**

Per had a passion for training – advisors, salespeople, sprayer operators and he held many many courses around the world. He had a special passion for those who work in the most risky environment; operators of knapsack sprayers in developing countries. He arranged his last course just two months before his death. The topic was, as always, safety and efficient plant protection, via a.o. certification and inspection of sprayers and training of operators and advisors. Mostly he was way ahead of the rest of us in discussions, thinking of details that he knew were important, but had to wait until the rest of us reached the same level...

About 10 years ago Per founded his own expert consultancy, Better-Spraying, where he continued work in standardisation, authored scientific papers and as consultant made practical test-work, arranged courses and produced training material.

Per was for decades, a member of European and International standardisation committees. He was a member of many Working Groups and also for some time, Chairman for the Working Group – Application Technology. He was also chairman for the Danish group for standardisation of sprayers, and a member of the AAB Pesticide Application group.

He had a strong belief in the importance of International Standards for the industry. He often said that it is a lot better to have a standard to relate to that is not perfect, than being an actor on the market in a world with different conditions in different countries.

Via his work Per, throughout the years, developed an extraordinary knowledge, for example, in the phasing of implementation of the EU directive on sustainable use of pesticides, that was greatly requested. Work meant a lot to Per. In spite of his increasing handicap, he took part in the work of standardisation till the end. During the last two years he hosted a number of WG meetings in his home, the last just 2 weeks before his death.

