



EPPO Workshop 2016

EPPO Workshop on harmonized dose expression for the zonal evaluation of plant protection products in high growing crops

Austrian Agency for Health and Food Safety
Vienna, 2016-10-18/20



Programme

EPPO Workshop on harmonized dose expression for the zonal evaluation of plant protection products in high growing crops

AGES, Spargelfeldstraße 191, 1220 Wien

Tuesday, 18 October

08:15 Registration

OPENING MORNING PLENARY SESSION

Chair: Vlasta Zlof

Opening address

09:00 Charlotte Leonhardt - *Head of Division for Food Security, AGES*
Monika Stangl - *Head of Unit for Plant Products, Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)*

Key notes

09:25 **The need to harmonize dose expression in the zonal efficacy evaluation**
Ingrid Langer - AGES, Austria

09:55 **EPPO Standard PP1/239 *Dose expression of plant protection products: status and use of this Standard based on the results of the Dutch workshop in 2009***
Erwin Mol - NPPO, the Netherlands

10:15 **Dose rate expressions in high growing crops: need for harmonization from the perspective of the plant protection product industry**
Frank Meier-Runge (Syngenta) and Martin Teichmann (BASF) - ECPA

10:40 Discussion on presentations

11:05 Coffee break

Presentations per Zone based on the questionnaire filled in by countries

Chair: Ingrid Langer

11:30 **Southern EU Authorization Zone**
Veronique Mironet - ANSES, France

12:10 **Northern EU Authorization Zone**
Lise Christina Deleuran - Aarhus University, Denmark

12:40 **Results of the questionnaire for Switzerland**
Pierre-Henri Dubuis - Agroscope, Switzerland

13:00 Lunch



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AFTERNOON PLENARY SESSION

Presentations per Zone based on the questionnaire filled in by countries (Continued)

Chair: Claudia Jilesen

13:50 **Central EU Authorization Zone**
Géza Nagy - National Food Chain Safety Office, Hungary

14:30 Discussion on all zonal presentations

Dose expressions and implementation with dose adjustments

14:50 **The implementation of the dose expression per hectare Leaf Wall Area (LWA) in vertical crops in Belgium**
Pierre Huorne - CRA-W, Belgium

15:05 **A proposal for dose expression and dose adjustment in the EU-Southern zone (DOS3D system)**
Santiago Planas - University of Lleida/Generalitat de Catalunya, Spain

15:20 **Pesticide dose adjustment to the crop environment (PACE)**
Jo O'Leary-Quinn and Kathryn Robert - CRD, United Kingdom

15:35 Discussion on presentations

16:00 Coffee break

16:30 **Stakes for a new model of dose expression in viticulture: advantages and point to be taken into consideration**
Sébastien Codis - IFV, France

16:45 **Dose adjustment for fruit orchards in France: proposals for the near future**
Florence Verpont - Ctifl, France

17:00 **Upcoming changes of dose expression for PPP into kg or L/ha LWA considered for the evaluation and registration of grapevine uses in Germany**
Gregor Kral - BVL, Germany

17:20 **Technical aspects of crop parameter measurements**
Ralph-Burkhardt Toews (Bayer CropScience) – ECPA

17:40 Discussion on presentations

Working groups: Introduction and practical information

18:00 Introduction and practical information - Ingrid Langer, Vlasta Zlof

18:15 Close of the first day



Programme

Wednesday, 19 October

WORKING GROUP SESSIONS

08:30 - 17:00 (Parallel sessions)

Working Group on Grapevine

Chair: Gabriele Kovacs

Co-chair: Ralph-Burkhardt Toews

Rapporteurs: Ingrid Langer and Frank Meier- Runge

Working Group on Pome Fruit

Chair: Pierre Hucorne

Co-chair: Jean Pierre Huby

Rapporteurs: Ewa Matyjaszczyk, Grzegorz Doruchowski and Peter Schlotter

Working Group on High Growing Vegetable Crops (Tomato)

Chair: Claudia Jilesen

Co-chair: Martin Hommes

Rapporteurs: Martin Teichmann and Maria Torne

Working Group on Citrus (Olives / Isolated Tree Orchards)

Chair: Patricia Chueca

Co-chair: Antonio Miranda

Rapporteurs: Agusti Soler and Dario Sterzi - Support: Juan M. Cantus and Elena Gutiérrez

10:15 – 10:45 Coffee break

12:30 – 13:30 Lunch

15:00 - 15:30 Coffee break

15:30 Preparation of the conclusions and presentations (in each group)

17:00 Close of the second day



19:00

Workshop Dinner

The Institute for Plant Protection Products at AGES invites participants to dinner at Augustinerkeller (Augustinerstrasse 1, 1010 Vienna)

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Thursday, 20 October 2016
MORNING PLENARY SESSION



Chair: Ingrid Langer and Claudia Jilesen

Presentation of results from the Working Group

- 08:30 Working Group on Grapevine
08:50 Working Group on Pome Fruit
09:10 Working Group on High-Growing Vegetable Crops (Tomato)
09:30 Working Group on Citrus (Olives / Isolated Tree Orchards)
- 09:50 Discussion
- 10:15 Coffee break
- 10: 45 **Workshop's Conclusions and Recommendations to be drafted**
- 12:15 Closing of the workshop
- 12:30 End of morning plenary session
- 12:30 Lunch (packed lunches)
- 13:00 Departure for the field trip
- 22:00 Return at the latest (the bus may stop at some hotels)



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The Need to Harmonize Dose Expression in the Zonal Efficacy Evaluation

Ingrid Langer

Austrian Agency for Health and Food Safety (AGES), Institute for Plant Protection Products, Wien, Austria

The dose expression of a plant protection product is characterized by the amount of product, linked to a certain reference unit. The use of a certain dose expression in the evaluation approach clearly influences the accuracy of results and their value for registration and local practice.

Dose expressions have been discussed on many occasions in Europe within the last decades. During this time, the EPPO Standard PP1/239 was prepared and adopted and common ground summarized. However, findings were rarely implemented in the evaluation of plant protection products.

Since Regulation (EC) 1107/2009 raised the evaluation of plant protection products from national to zonal level, harmonization of the evaluation approach in general and the use of a harmonized dose expression in high growing crops in particular gained considerable importance. Thereby, the selection of a certain dose expression is triggered by the need for accuracy of the evaluation, by the need for validity of zonal conclusions to all member states and an easy convertibility to national registrations and dose expressions.

However, when selecting the most appropriate dose expression for the zonal evaluation, numerous factors have to be considered, such as the legislation on EU and on member state level, local practice (crop structure, technical equipment, history of efficacy evaluation, expression of dosing) and the information provided in single trial reports.

In this workshop, evaluators, applicants, contractors and authorities should become aware of the current challenges and needs in the zonal efficacy assessment of high growing crops. Major steps towards harmonization should be made including the specification of the most appropriate dose expression for zonal efficacy evaluation and the definition of terms essential for a common understanding.

EPPO Standard PP 1/239 Dose expression of plant protection products: status and use of this Standard based on the results of the Dutch workshop in 2009

Erwin S.N. Mol

National Plant Protection Organization, Wageningen, the Netherlands

In 2009 a meeting was held with regulators, applicants and scientists to discuss the different dose expression methods for foliar pesticide applications in apple trees in different European countries. A harmonized dose expression is needed for regulators for mutual recognition, for applicants to harmonize data packages and for growers to have a clear understanding of the dose expression on the label. The current situation, the relation between the dose expression and the tree structures in the countries, and possibilities to harmonize the dose expression were discussed.

It was concluded that more harmonization is needed, but there was no agreement on a harmonized system of dose expression. However, it was agreed that:

- extra information on maximum doses and spray volumes on the labels is necessary;
- all relevant information should be available in trial reports to allow conversion to other expressions;
- 3-dimensional expressions are suitable;
- a web based service to convert to other expressions should be created;
- the need for a glossary of terms.

These agreements were discussed at EPPO, resulting in an adjustment of the Standard PP 1/239 'Dose expression for plant protection products' in 2012.

This Standard shows how to convert between different dose expressions in high-growing crops. It can be done directly from the experimental data, when all relevant parameters in the efficacy trials are available. It can also be done from the doses expressed on the label in a country, assuming this relates to a known standard structure, and, where relevant, to a specific growth stage. Having all necessary data of the crop structure and the treatment, it is possible to use this Standard to convert between different dose expressions.

Dose rate expressions in high growing crops: need for harmonization from the perspective of the Plant Protection Product industry

Frank Meier-Runge, Martin Teichmann
European Crop Protection Association (ECPA)

Authors: Ralph-Burkhardt Toews¹, Jean-Pierre Huby², Bernardo Pollmann³, Martin Teichmann⁴, Peter Schlotter⁵, Frank Meier-Runge⁶

¹Bayer CropScience AG, ²DuPont de Nemours S.A.S., ³Adama Agriculture B.V., ⁴BASF SE, ⁵Dow AgroSciences, ⁶Syngenta Crop Protection AG

The dose rate defines the amount of an active ingredient placed as an initial deposit on the target area, which is adequate to control a certain target organism.

We must distinguish between:

- Dose expression: the **unit** in which the dose is expressed
- Dose rate: the **quantity** of product to be applied
- Dose adjustment: the adjustment of the dose rate to the specific field situation

Recommended dose rates in vertical crops are expressed in various ways on product labels within the European Union countries. The current EPPO guideline PP1/239(2) revised in 2012, also permits various dose rate expressions.

Spraying machines deliver a certain water volume to a specific area. The treated area is defined by the area that is covered by working nozzles. In vertical crops the nozzles cover a vertical plane, defined by row length and spray hedge height from both sides of the crop row. Therefore, the correct dose expression unit cannot be the ground area used for example in arable crops.

The Plant Protection Product industry recommends the use of “treated Leaf Wall Area (tLWA)” as a common dose expression unit in biological trials in vertical crops for new active ingredients.

$$\text{treated Leaf Wall Area (m}^2\text{)} = 2 * \text{Treated Canopy Height (m)} * \text{Row Length (m)}$$

$$\text{treated Leaf Wall Area (m}^2\text{)} = \frac{2 * \text{Treated Canopy Height (m)} * \text{Groundarea (m}^2\text{)}}{\text{Row Distance (m)}}$$

The implementation should be a zonal approach to facilitate the registration process and focus first on key crops.

The PPP industry needs planning security and clarity concerning transition of dose rate expression and implementation timelines as well as clarity on validity of existing risk assessments. An adequate transition period of at least 3 years is necessary.

The implementation of the dose expression per hectare Leaf Wall Area (LWA) in vertical crops in Belgium

Pierre Hucorne

Wallon Agricultural Research Center (CRA-W), Gembloux, Belgium

In Belgium the first attempts to express the dose per ha LWA were made in 1996, focusing on authorizations of new active substances in top fruit. In 2007, this dose expression was also implemented in glasshouse fruiting vegetables, for small fruit and for grapevine.

A long-lasting official stewardship has been put into place to explain this new approach in top fruit production. The growers are now well informed and apply this dose expression in practice. However, the grower himself/herself or the stewardship service still recalculate the dose in L/ha soil. According to the Federal Food Agency recommendations, the doses of applied products must be expressed in ha in the cadastral area.

The fruit and vegetables growers do not apply the dose per ha LWA yet in everyday practice. However, the stewardship service recalculates the corresponding dose in concentration/spray volume for the grower.

A significant amount of experience has been gained in Belgium in evaluating trials from Maritime EPPO zone countries and translating their various dose expressions. Dose translation to ha LWA is needed for mutual recognition of authorizations from the neighbouring countries.

The dose per ha LWA (EPPO Standard PP 1/239(2)) is an appropriate harmonization tool and should be used as common standard in efficacy trials and when conducting assessments for crops treated as “vertical surfaces”:

- It reflects exactly how the treatment is done in practice.
- It can be converted to all country specific risk assessment scenarios (provided that the assumptions of the model are known) and to national dose expressions.

A complete reporting of the trial parameters is needed for a successful conversion. Implicit assumptions like “standard orchard dimensions”, “theoretical spray volume” should be avoided.

A proposal for dose expression and dose adjustment in the EU-Southern zone (DOSAFRUT system)

Santiago Planas
University of Lleida / Generalitat de Catalunya, Spain

Authors: Santiago Planas^{1,2}, Carla Roman¹, Ricardo Sanz¹, Joan Ramon Rosell¹

¹Universitat de Lleida – Agrotecnio Center. RG in AgICT & Precision Agriculture. Lleida. SPAIN,

²Generalitat de Catalunya. Dep. Agriculture, Livestock, Fisheries & Food. Lleida. SPAIN

Approximately 10 M ha of fruit orchards and vineyards are located in Europe, mainly in the Southern Zone (93%). In this zone these 3D crops are usually grown in a wider and, frequently, higher canopy than is usual in the Northern and Central zones.

Recently, crown height (CH) and leaf wall area (LWA) are being promoted as harmonized methods for dose expression. Nevertheless, they seem to be too simplified and uncertain for the Southern canopy structures to ensure the minimum (safe) but sufficient (efficient) amount of chemicals are sprayed in order to comply with the SUD Directive (2009/128/EC).

Although air assistance spraying systems are largely implemented, one of the main constraints in the Southern zone is the penetration of the spray droplets into the wide canopies. Consequently, canopy width is a mandatory dimension to be considered. Other factors to be considered are the growth stage or preferably the leaf area index (LAI) which differs significantly as the season progresses and, finally, the operating conditions because the more efficient the spraying operation the lower the quantity of pesticide required.

The DOSAFRUT system assumes the labelled concentration (%) and calculates the pesticide dose (kg or L ha⁻¹) determining the optimized spray volume rates (L ha⁻¹) considering the above mentioned variables. With this aim the LAI is robustly estimated at a field level in a straightforward way by the solid housing parameter (height and thickness minus the porosity).

In the recent years a tool to operate this system is accessible worldwide at www.dosafrut.es. The system has been extensively validated in deciduous fruits when applying adjusted doses with significant pesticide saving. More recently similar trials have been carried out on grapes, also providing good results. Subsequently, the system has been renamed as DOSA3D.

This work is being developed within AGVANCE (ES-AGL2013-48297-C2-2-R) and EUCLID (633999-H2020-SFS-2014-2) projects, financed by the Spanish Government and the EU, respectively.

Pesticide dose adjustment to the crop environment (PACE)

Jo O'Leary-Quinn and Kathryn Robert
Chemical Regulation Directorate, York, United Kingdom

The UK has provided funding to allow the development of a method to enable those applying pesticides in orchards to achieve an approximately constant deposit on trees of different size and canopy density. Thus where trees are small and less dense it is possible to determine a reduced dose that will still maintain biological efficacy. Additionally, funding was provided to ensure that there was a transfer of the scheme to growers so that it is used in practice and growers fully understand the scheme.

We will explain the background to the scheme and why it is important to distinguish between dose expression and dose adjustment and the role that the label or other specific advice can play in ensuring that the pesticides are applied efficaciously in the orchard. The scheme considers the following key parameters; the tree height and spacing (the aspect ratio) as well as the canopy density and on this basis the dose for the crop is adjusted whilst still remaining within the maximum application rate e.g., g a.s./ha. This scheme is widely used in the UK and now has a proven track record and provides a practical approach to dose adjustment taking into account the full range of different types of orchards that occur e.g. standard modern, multi-row, cider and 'heritage' orchards.

Details are available at: <http://www.pjwrc.co.uk>

Stakes for a new model of dose expression in viticulture: advantages and points to be taken into consideration

Sébastien Codis
French Wine and Vine Institute, Montpellier, France

The current dose expression system in France (fixed dose rate per hectare) or in Italy and Spain (% max volume/ha) does not aid compliance with the new objectives of increasing the sustainability of pesticides use. Indeed, at early growth stages, the current dose expression systems lead to doses higher than that required and substantial off-target losses that could be avoided using doses adjusted to the development of the canopy. An ideal dose expression system would integrate crop parameters and would lead to constant and sufficient deposits per unit area on the target in order to ensure protection efficacy.

IFV (French Wine and Vine Institute) and IRSTEA (French Research Institute of Science and Technology for Environment and Agriculture) have carried out studies in order to assess spraying performance in a wide range of field conditions. The indicators used are the normalized average deposition of product per unit area on the crop (ng/dm^2 for 1 g applied per ha) and the homogeneity of deposition within the canopy (CV, %).

Studies aimed to identify the best combination of crops parameters on which a new dose expression could be based. Results show a much more accurate correlation between deposit and TRV (Tree Row Volume) than between deposit and LWA (Leaf Wall Area) although TRV is not always easy to measure in the field.

Considering a dose expression system only based on LWA, the strongly varying spray deposits (from 1 to more than 2) associated with the same LWA, due to not taking into account canopy thickness, would imply that over dosage would be recommended in a lot of cases.

Deposition measurement shows that a linear adjustment of doses to the LWA leads to under-dosing at early growth stages which may be detrimental to production objectives. Thus, it would be necessary to accompany LWA dose expression with 2 thresholds: firstly a maximum threshold of LWA (LWA max) that will cover most of the situations and would be considered for risk assessment and secondly a minimum threshold of dose used for very low LWA should be considered to guarantee efficacy for early growth stages.

Dose adjustment for fruit orchards in France: proposals for the near future

Florence Verpont

Technical Institute for fruits and vegetables (Ctifl), Prignonrieux France

In France the applied dose of phytosanitary products in fruit growing is an important concern. Orchards have a high diversity of canopy structures (fruit hedges for pome fruits, goblets for stone fruits, and large volumes for nuts). In addition, for each structure there is a significant change in the vegetation volume between bud break and harvesting. In the past a common way of spraying orchards was to apply spray until run off. The French dose expression for the registration of the product was a number of kgs or Ls of product / hL of spray volume. At present, with the new sprayers which allow low volume treatments, the producers multiply the dose per hL by ten (on the basis of 1000 L/ha) and apply this single dose whatever the sprayed volume. This then gives an equivalent to a fixed dose per ha that the French registration authority set up a few years ago as a maximum applied dose. This practice is easy to implement by the producer but it leads to very variable deposits per unit of foliage area depending on the vegetation. Dose adjustment to the crop growth stage is a clear goal of reducing inputs identified by the French government. One of the aims of the national project PULVARBO (2015-2020, optimizing spray practices in orchards) is to create a support tool for the practical implementation of dose adjustment. To reach this objective trials have been set up: characterization of orchards by different indicators (treated height of the trees, width of canopy, distance between rows, leaf wall area, tree row volume), measurements of deposits linked to the canopy structure, biological trials to evaluate the impact of a dose adjustment during a complete season. At this stage of the project some preliminary answers can be given.

Upcoming changes of dose expression for PPP into kg or L/ha leaf wall area (LWA) considered for the evaluation and registration of grapevine uses in Germany

Gregor Kral

Federal Office of Consumer Protection and Food Safety, Braunschweig, Germany

In Germany the current dose expression system in grapevine uses is based on per ha ground area taking into account 4 stages (basic rate, BBCH 61, BBCH 71, BBCH 75). This system is entitled the "factor system".

In view of the change in dose expression recalculation, from the current factor system to the upcoming LWA system, the dose rate per ha LWA differs during the season. Thus, an adaptation of already authorized uses into the new dose expression system is not possible. It seems that it will only be possible to use the new dose expression system with new applications (new products and renewals).

In the case of renewal applications the question is how should existing efficacy study reports be used without referring to crop structures. Recalculation into the LWA dose expression system is then only possible when referring to the already authorized maximum application rate on a standard LWA, e.g. 18 000 m²/ha ground area.

Which LWA standard should be used will be discussed. It is a delicate balance between using a too low or too high LWA standard.

A too high LWA standard results in:

- too low application rates per LWA from the efficacy point of view,
- too high authorized application rates per ha ground with possible problems that could be raised during risk assessment.

A too low LWA standard results in:

- too high application rates per LWA with possible residue problems,
- too low authorized application rates to treat high LWA situations.

After changing the dose expression the following information concerning dose will be included into the GAP:

- the maximum single application rate per ha ground area,
- the total dose per ha ground area,
- the dose per ha LWA.

Technical aspects of crop parameter measurements

Ralph-Burkhardt Toews
European Crop Protection Association (ECPA)

Authors: Ralph-Burkhardt Toews¹, Jean-Pierre Huby², Bernardo Pollmann³, Martin Teichmann⁴, Peter Schlotter⁵, Frank Meier-Runge⁶

¹Bayer CropScience AG, ²DuPont de Nemours S.A.S., ³Adama Agriculture B.V., ⁴BASF SE, ⁵Dow AgroSciences, ⁶Syngenta Crop Protection AG

Introduction: The documentation of crop parameters in trials is essential to accurately describe the crop for product applications. In trial reports different terms may be used to describe the same parameter, undermining consistency. Therefore agreed harmonized terms, definitions and measurement methods of crop parameter in trials are proposed.

Treated Canopy Height: The term Treated Canopy Height should replace currently used terms like Canopy Height, Foliage Height, Plant Foliage Height or others.

Treated Canopy Height describes the actual oversprayed treated height of the canopy of grapes or pome fruit and is very often equivalent to the working dimension of the sprayer and may vary per application. If only a part of the crop is treated this height is the Treated Canopy Height and has to be reported as such. Generally, the trunk is disregarded.

Row Spacing: The term Row Spacing should replace currently used terms like Row Distance or Distance between Rows.

Other parameters like Plant Height, Spacing within row, Sides applied or Rows per Plot are still valid and should be documented in grape and orchard trial reports.



Fig. 1 Measurement of crop parameter



Fig. 2 Treated Canopy Height

Measurement of crop parameters in grape trials: The main growing systems in the European vineyards trials are defined which have to be reported in trial documentation.

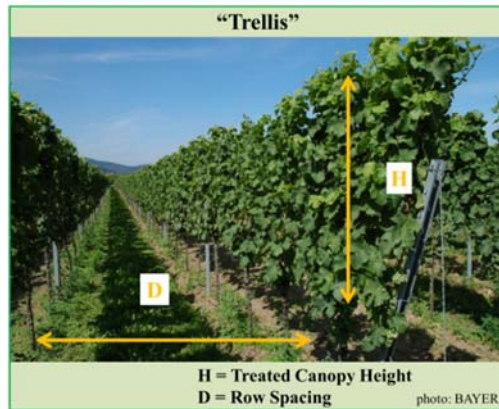


Fig. 3 Measurements in Trellis

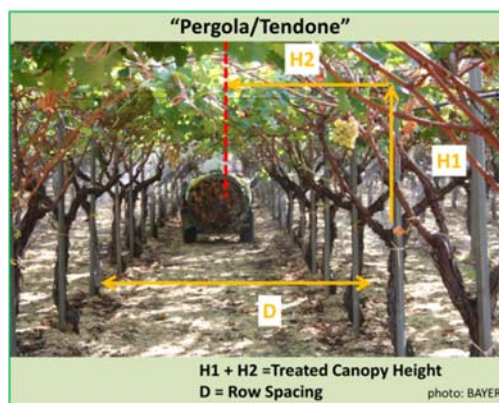


Fig. 4 Measurements in Pergola

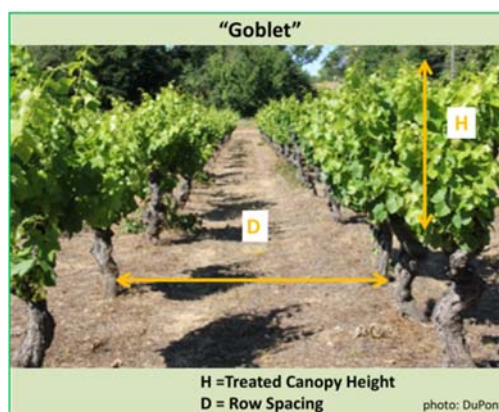


Fig. 5 Measurements in Goblet

PARTICIPANTS

Austria	FORNECK Astrid (Ms)	Universität für Bodenkultur Wien, Department für Nutzpflanzenwissenschaften, Abt. Wein- und Obstbau Konrad Lorenz Strasse 24, 3430 Tulln, Austria Tel: +43-174654985000 - astrid.forneck@boku.ac.at
	KOVACS Gabriele (Ms)	AGES, Institute for Plant Protection Products, Spargelfeldstrasse 191, A-1220 Vienna, Austria Tel: +43-5055533443 - gabriele.kovacs@ages.at
	KÜHRER Erhard (Mr)	Weinbauschule Krems, Wienerstraße 101, 3500 Krems An Der Donau , Austria Tel: +43-27328751629 - erhard.kuehrer@wbs-krems.at
	LANGER Ingrid (Ms)	Austrian Agency for Health and Food Safety (AGES), Institute for Plant Protection Products, Spargelfeldstrasse 191, 1220 Wien, Austria Tel: +43-5055533464 - ingrid.langer@ages.at
	LEDOLTER Peter (Mr)	AGES, Spargelfeldstrasse 191, 1220 Vienna, Austria Tel: +43-5055533427 - peter.ledolter@ages.at
	MICHLITS Franz (Mr)	Syngenta, Anton-Baumgartner-Strasse 125/2/3/1, 1230 Wien, Austria Tel: +43-16623130600 - franz.michlits@syngenta.com
Belgium	DIERYCK Benjamin (Mr)	Redebel Regulatory Affairs SCRL, Rue de Chassart 4, 6221 Saint-Amand, Belgium Tel: +32-71853392 - b.dieryck@redebel.com
	HUCORNE Pierre (Mr)	CRA-W, Département de Phytopharmacie, 11 rue du Bordia, 5030 Gembloux, Belgium Tel: +32-81625262 - p.huorne@cra.wallonie.be
	JEGERINGS Marco (Mr)	Loxia Consulting, Square de l'Arbalète 8, 1170 Bruxelles, Belgium Tel: +32-478468626 - m.jegerings@loxiaconsulting.eu
	LEROUX Pauline (Ms)	Belchim Crop Protection, Technologielaan 7, 1840 Londerzeel, Belgium Tel: +33-472206475 - pauline.leroux@belchim.com
	VAN AVERBEKE Annette (Ms)	Redebel Regulatory Affairs SCRL, Rue de Chassart 4, 6221 Saint-Amand, Belgium Tel: +32-71853392 - a.vanaverbeke@redebel.com
Bulgaria	YOLOVA Elena (Ms)	Chemconsult Ltd., 36 Dragan Tzankov blvd, Interpred - WTC, Sofia, 1000 Sofia, Bulgaria Tel: +359-24260055 - eyolova@chemconsultbg.com
Czech Republic	ZLAMALOVA Tereza (Ms)	Central Institute for supervising and testing in agriculture, Zemědělská 1752/1a, 61300 Brno, Czech Republic Tel: +420-545110446 - tereza.zlamalova@ukzuz.cz
Denmark	DELEURAN Lise (Ms)	Department of Agroecology, Aarhus University, Forsoegsvej 1, Flakkebjerg, 4200 Slagelse, Denmark Tel: +45-87158278 - lise.deleuran@agro.au.dk
France	CAGNIEUL Philippe (Mr)	Consultant, 28 rue Juliette Lamber , 75017 Paris, France Tel: +33-(0)629969663 - philippe.cagnieul@gmail.com

France	CODIS Sébastien (Mr)	French Research Institute for Vine and Wine, Institut Français de la Vigne et du Vin - Unité de Montpellier, 361 rue JF Breton, 34196 Montpellier, France Tel: +33-467046307 - sebastien.codis@vignevin.com
	FERRE Eric (Mr)	Anadiag, 16 rue ampère, 67500 Haguenau, France Tel: +33-561471567 - eric.ferre@anadiag.fr
	FIAT Noélie (Ms)	Sumitomo Chemical Agro Europe S.A.S., Parc d'Affaires de Crécy, 10A Rue de la Voie Lactée, 69370 Saint Didier Au Mont D'or, France Tel: +33-630553202 - noelie.fiat@sumitomo-chem.fr
	GALY Hubert (Mr)	Anadiag, 75 voie du TOEC, 31076 Toulouse, France Tel: +33-607166832 - hubert.galy@anadiag.fr
	GAUTRAIS Jérémy (Mr)	Agchem Project Consulting, 290 Avenue du Tourail Coustellet, 84580 Oppede, France Tel: +33-432529353 - jeremy.gautrais@apc.eu.com
	GODARD Jean-François (Mr)	BAYER SAS , Bayer S.A.S., 16 rue Jean-Marie Leclair CS90106, 69266 Lyon cedex 09, France Tel: +33-0676940112 - jean-francois.godard@bayer.com
	HUBY Jean Pierre (Mr)	DuPont de Nemours, 24 rue du moulin, 68740 Nambenheim, France Tel: +33-389832715 - jean-pierre.huby@dupont.com
	HUFNAGL Andrea (Ms)	Dow AgroSciences, 371 Rue Ludwig van Beethoven, 06904 Sophia Antipolis Cedex, France Tel: +33-493956531 - ahufnagl@dow.com
	IMBERT Jean-Christophe (Mr)	Agrolis Consulting, ZA La Grande Marine, 185 Avenue André Ampère, 84800 L'isle sur la Sorgue, France Tel: +33-603964750 - jc.imbert@agrolis.fr
	MIRONET Véronique (Ms)	Anses - French National Agency for Food, Environmental and Occupational Health Safety, 14 rue Pierre et Marie Curie, 94700 Maisons-Alfort, France Tel: +33-149773793 - veronique.mironet@anses.fr
	RISON Jean-Luc (Mr)	DuPont de Nemours, 24 rue du Moulin, 68740 Nambenheim, France Tel: +33-0389832732 - jean-luc.rison@dupont.com
	SAMHAT Philippe (Mr)	Agrolis Consulting, 11 rue du Lac, 31340 Villemur-Sur-Tarn, France Tel: +33-675033777 - philippe.samhat@agrolis.fr
	VERPONT Florence (Ms)	Centre Technique Interprofessionnel des Fruits et Légumes, 28 route des Nébouts, 24130 Prignonieux, France Tel: +358-0553580005 - verpont@ctifl.fr
Germany	BATHEL Kathrin (Ms)	Eurofins Agrosience Services GmbH, Carl-Goerdeler-Weg 5, 21684 Stade, Germany Tel: +49-41418003296 - kathrinbathel@eurofins.com
	BÖCKMANN Elias (Mr)	Julius Kühn-Institut (JKI), Bundesforschungsinstitut für Kulturpflanzen, Institut für Pflanzenschutz in Gartenbau und Forst, Messeweg 11/12, 38104 Braunschweig, Germany Tel: +49-5312994441 - elias.boeckmann@julius-kuehn.de
	BREMER Melanie (Ms)	DHD-Consulting GmbH, Lilly-Reich-Str. 8, 31137 Hildesheim, Germany Tel: +49-51219187334 - melanie.bremer@dhd-consulting.de

Germany	DONATI Alexandra (Ms)	Adama Deutschland GmbH, Edmund-Rumpler-Straße 6, 51149 Koeln, Germany Tel: +49-22035039504 - alexandra.donati@adama.com
	EISELE Isabelle (Ms)	TSGE Consulting, Richthofenstraße 29, 31137 Hildesheim, Germany Tel: +49-(0)5121708580 - isabelle.eisele@tsgeconsulting.com
	GOERTZ Dörte, (Ms)	Scientific Consulting Company GmbH, Am Grenzgraben 11, 55545 Bad Kreuznach, Germany Tel: +49-671298460 - ramona.zerrouki@scc-gmbh.de
	HELD Katja (Ms)	DHD-Consulting GmbH, Lilly-Reich-Str. 8, 31137 Hildesheim, Germany Tel: +49-51219187324 - katja.held@dhd-consulting.de
	HOMMES Martin (Mr)	Institut for Plant Protection in Horticulture and Forests, Messeweg 11/12, D-38104 Braunschweig, Germany Tel: +49-5312994400 - martin.hombres@julius-kuehn.de
	KÖRSCHENHAUS Johannes-Wilhelm (Mr)	ISK Biosciences Europe N.V., Stormweg 6, 97941 Tauberbischofsheim, Germany Tel: +49-093418494504 - isk-jwk@t-online.de
	KRAL Gregor (Mr)	Federal Office of Consumer Protection and Food Safety, Messeweg 11/12, 38104 Braunschweig, Germany Tel: +49-5312993617 - gregor.kral@bvl.bund.de
	LECHNER Martin (Mr)	DuPont de Nemours (Deutschland) GmbH, Hugenottenallee 175, 63263 Neu-Isenburg, Germany Tel: +49-6102181435 - martin.lechner@dupont.com
	MEIER-RUNGE Frank (Mr)	Syngenta AG, Am Technologiepark 1-5, 63477 Maintal, Germany Tel: +49-61819081345 - frank.meier-runge@syngenta.com
	RAFFIUS Korinna (Ms)	EBRC Consulting GmbH, Raffaelstr. 4, 30177 Hannover, Germany Tel: +49-5118983890 - k.raffius@ebrc.de
	SCHLECHTER Kerstin (Ms)	RIFCON GmbH, Goldbeckstrasse 13, 69493 Hirschberg, Germany Tel: +49-62018452810 - yvonne.schmitt@rifcon.de
	SCHLOTTER Peter (Mr)	Dow AgroSciences GmbH, Truderingerstr. 15, 81677 München, Germany Tel: +49-8945533126 - pschlotter@dow.com
	TEICHMANN Martin (Mr)	BASF SE, E-APE/MT, Speyerer Str. 2, 67117 Linmburgerhof, Germany Tel: +49-6216027741 - martin.teichmann@basf.com
	TOEWS Ralph-Burkhardt (Mr)	Bayer Crop Science, Alfred-Nobel-Strasse 50, D-40789 Monheim, 40789 Monheim, Germany Tel: +49-2173384292 - burkhardt.toews@bayer.com
	VOIGT Otilia (Ms)	Helm AG, Nordkanalstrasse 28, 20097 Hamburg, Germany Tel: +49-4023751308 - o.voigt@helmag.com
	WAECHTER Kathrin (Ms)	RIFCON GmbH, Goldbeckstrasse 13, 69493 Hirschberg, Germany Tel: +49-62018452810 - yvonne.schmitt@rifcon.de
Greece	KARANASIOS Evangelos (Mr)	Benaki Phytopathological Institute, 8 St. Delta str., GR-145 61 Kiffisia, Attiki, Greece Tel: +30-2108180348 - e.karanasios@bpi.gr

Greece	PITAROKILI Danae (Ms)	Ministry of Rural Development and Food, Syggrou 150, Kallithea, 17671 Athens, Greece Tel: +30-2108071084 - dpitarokili@minagric.gr
Hungary	JUHASZ Máté (Mr)	Syngenta, Aliz utca 2, 1117 Budapest, Hungary Tel: +36-209647812 - mate.juhasz@syngenta.com
	NAGY Géza (Mr)	National Food Chain Safety Office, Budaörsi út 141-145., H-1118 Budapest, Hungary Tel: +36-13091046 - nagygez@nebih.gov.hu
Italy	BALSARI Paolo (Mr)	DISAFA Univ.of Turin, Via L. da Vinci 44 Grugliasco (Torino), 10195 Grugliasco, Italy Tel: +39-6708587 - paolo.balsari@unito.it
	BERGAGLIO Stefano (Mr)	Anadiag Italia, Strada Savonesa n. 9 Fraz. Rivalta Scrivia, 15050 Tortona (al), Italy Tel: +39-3474145655 - stefano.bergaglio@anadiag.it
	BERGAMASCHI Andrea (Mr)	UPL Italia s.r.l., Terni 275, 47522 Cesena, Italy Tel: +39-3355642415 - andrea.bergamaschi@uniphos.com
	BOSCO Valentino (Mr)	Dow AgroSciences Italia Srl, Via Persereano, 10/9, 33050 Lauzacco, Italy Tel: +39-0432675235 - vbosco@dow.com
	BUGIANI Riccardo (Mr)	Servizio fitosanitario regionale (Plant Protection Service), Emilia-Romagna Region, Via Corticella 133, 40128 Bologna, Italy Tel: +39-0514159281 - rbugiani@regione.emilia-romagna.it
	DI PRIMO Pietro (Mr)	AGRIGEOS SRL, Via Etna, 112, 95010 Santa Venerina, Fraz. Cosentini-Linera (ct), Italy Tel: +39-095958316 - diprimo@agrigeos.com
	MARUCCO Paolo (Mr)	DISAFA Università di Torino, Largo Braccini 2, 10045 Grugliasco, Italy Tel: +39-0116708599 - paolo.marucco@unito.it
	STERZI Dario (Mr)	Gowan, c.da via di Guardia, snc, 82034 San Lorenzo Maggiore, Italy Tel: +39-3385320744 - dsterzi@gowanco.com
Lithuania	STONCIENE Migle (Ms)	State Plant Service under the Ministry of Agriculture of the Republic of Lithuania, Ozo street 4A, LT-08200 Vilnius, Lithuania Tel: +370-52624940 - migle.stonciene@vatzum.lt
Netherlands	JILESEN Claudia (Ms)	National Plant Protection Organization, P.O. Box 9102, 6700 HC Wageningen, Netherlands Tel: +31-882231340 - c.j.t.j.jilesen@nvwa.nl
	MOL Erwin (Mr)	National Plant Protection Organization, P.P. Box 43006, 3540 AA Utrecht, Netherlands Tel: +31-646291787 - e.s.n.mol@nvwa.nl
	SPITS Harro (Mr)	Adama Northeren Europe BV, Arnhemseweg 87, 3832 GK Leusden, Netherlands Tel: +31-334453187 - harro.spits@adama.com
Poland	DORUCHOWSKI Grzegorz (Mr)	Research Institute of Horticulture, Konstytucji 3 Maja 1/3, 96-100 Skierniewice, Poland Tel: +48-468345247 - grzegorz.doruchowski@inhort.pl
	LEWKO Jacek (Mr)	BASF Polska sp. z o.o., Al. Jerozolimskie 154, 02-326 Warsaw, Poland Tel: +48-601759772 - jacek.lewko@basf.com

Poland	MATYJASZCZYK Ewa (Ms)	Plant Protection Institute, National Research Institute, Wegorka 20, 60-318 Poznań, Poland Tel: +48-618649171 - e.matyjaszczyk@iorpib.poznan.pl
Portugal	PRATES Maria Assunção (Ms)	Direção Geral de Alimentação e Veterinária, Quinta do Marquês, 2780-155 Oeiras Lisboa, Portugal Tel: +351-214464086 - assuncaobrates@dgav.pt
Slovakia	VAVRIK David (Mr)	Slovak institute of agriculture in Slovakia, Matúškova 21, 833 16 Bratislava, Slovakia Tel: +421-259880322 - david.vavrik@uksup.sk
Spain	ALONSO PRADOS José Luis (Mr)	INIA. Technical Directorate for the assessment of Plant Varieties and Plant Protection Products, Edificio El Cubo, Ctra. de la Coruna km 7, 200, 28040 Madrid, Spain Tel: +34-913471473 - prados@inia.es
	BANYULS I FERRANDO Nuria (Ms)	GAB Consulting Spain sl, av. cortes Valencianas 39 8B, 46015 Valencia, Spain Tel: +34-961551216 - nuria.banyuls@gabconsulting.de
	BRAVO DOMÍNGUEZ Maria Inmaculada (Ms)	Ministerio de Agricultura, Alimentación y Medio Ambiente, c/ Almagro 33, Edificio Eduardo Dato 1ª planta, 28010 Madrid, Spain Tel: +34-913471811 - ibravo@magrama.es
	CANTUS Juan Miguel (Mr)	Syngenta, Ribera del Loira, 8-10. 3rd floor, 28042 Madrid, Spain Tel: +34-913876460 - juan_miguel.cantus@syngenta.com
	CHUECA Patricia (Ms)	Instituto Valenciano de Investigaciones Agrarias, Ctra. CV-315, Km 10,7 , 46113 Moncada, Spain Tel: +34-963424000 - chueca_pat@gva.es
	CUESTA MARISCAL Javier (Mr)	UPL Europe Ltd, The Centre, Birchwood Park, 08029 Barcelona, Spain Tel: +34-934941524 - javier.cuesta@uniphos.com
	GUTIERREZ Elena (Ms)	National Institute for Agricultural and Food Research and Technology - Unidad de Productos Fitosanitarios, Dirección Técnica de Evaluación de Variedades y Productos Fitosanitarios, Ctra. La Coruña, km 7.5, 28040 Madrid, Spain Tel: +91-3473929 - gutierrez.elena@inia.es
	MIRANDA-FUENTES Antonio (Mr)	University of Córdoba, Department of Rural Engineering, Leonardo da Vinci, Campus Rabanales, Ctra. Nacional IV, km 396, 14014 Córdoba, Spain Tel: +34-957212689 - g62mifua@uco.es
	PLANAS DE MARTI Santiago (Mr)	Universitat de Lleida - Agrotecnio // Generalitat de Catalunya, Rovira Roure 191, 25198 Lleida, Spain Tel: +34-627481025 - splanas@eagrof.udl.cat
	SOLER Agusti (Mr)	Bayer CropScience, C/ Charles R. Darwin, 13, E-46980 Paterna (valencia), Spain Tel: +34-938678719 - agusti.soler@bayer.com
	TORNE RIFA Maria (Ms)	Dow Agrosiences Ibérica S.A, Ribera del Loira, 4-6, 4a planta, 28042 Madrid, Spain Tel: +34-917407803 - mtorne@dow.com
Switzerland	DUBUIS Pierre-Henri (Mr)	Institut des Sciences en Production Végétale, Agroscope, Route de Duillier, 1260 Nyon, Switzerland Tel: +41-584604352 - pierre-henri.dubuis@agroscope.admin.ch

Switzerland	VOCK Christoph (Mr)	Syngenta Crop Protection AG, Schwarzwaldalle 215, RO-B8.4.38, 4058 Basel, Switzerland Tel: +41-613236313 - christoph.vock@syngenta.com
United Kingdom	CORNISH-BOWDEN Charlotte (Ms)	Arysta LifeScience, Brooklands Farm, Cheltenham Road, WR11 2LS Evesham, United Kingdom Tel: +44-7733013780 - charlotte.cornish-bowden@arysta.com
	GEMINIANI Emanuele (Mr)	UPL Europe Ltd, The Centre, Birchwood Park, WA36YN Warrington, United Kingdom Tel: +44-7827852239 - emanuele.geminiani@uniphos.com
	GOLOGAN Aura-Denisa (Ms)	Arysta Lifescience, Brooklands Farm, Cheltenham Rd, Evesham, Worcs, WR11 2LS, WR11 2LS Evesham, United Kingdom Tel: +44-7581513680 - denisa.gologan@arysta.com
	O'LEARY QUINN Joanna (Ms)	Chemical Regulations Division, Mallard House, 3 Peasholme Green, York , YO1 7PX York, United Kingdom Tel: +44-2030281232 - jo.olearyquinn@hse.gov.uk
	POULTONQ Graham (Mr)	UPL Europe Ltd, The Centre, Birchwood Park, WA36YN Warrington, United Kingdom Tel: +44-7827852239 - graham.poulton@uniphos.com
	ROBERT Kathryn (Ms)	HSE, Chemicals Regulation Directorate, 5.S.1, Redgrave Court, Merton Road, Bootle, Liverpool, L20 7HS Liverpool, United Kingdom Tel: +44-1519513378 - krobert@hse.gov.uk
EPPO	ZLOF Vlasta (Ms)	OEPP/EPPO, 21 boulevard Richard Lenoir, 75011 Paris, France Tel: +33-145207794 - vz@epo.int
	LUCCHESI Valerio (Mr)	OEPP/EPPO, 21 boulevard Richard Lenoir, 75011 Paris, France Tel: +33-145207794 - lucchesi@epo.int