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**ENVIRONMENT DIRECTORATE  
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THE WORKING PARTY ON CHEMICALS, PESTICIDES AND BIOTECHNOLOGY**

**Series on Pesticides  
No. 50**

**REPORT OF THE OECD SEMINAR ON PESTICIDE RISK REDUCTION THROUGH BETTER  
NATIONAL RISK MANAGEMENT STRATEGIES FOR AERIAL APPLICATION**

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OECD Environment, Health and Safety Publications  
Series on Pesticides

No. 50

**REPORT OF THE OECD SEMINAR  
ON PESTICIDE RISK REDUCTION  
THROUGH BETTER NATIONAL RISK  
MANAGEMENT STRATEGIES  
FOR AERIAL APPLICATION**

**24 February 2009, San Francisco, United States of America**

**IOMC**

**INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS**

A cooperative agreement among **FAO, ILO, UNEP, UNIDO, UNITAR, WHO and OECD**

**Environment Directorate**

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**Paris 2010**

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## FOREWORD

This document is the report of the OECD *Seminar on Pesticide Risk Reduction through Better National Risk Management Strategies for Aerial Application* that took place on 24 February 2009, in San Francisco, United States of America. It was hosted by the US Environmental Protection Agency (US-EPA) and was chaired by Dr. Wolfgang Zornbach of the German Federal Ministry of Food, Agriculture and Consumer Protection.

This was the tenth in a series of Seminars organised by the OECD Pesticide Risk Reduction Steering Group, a sub-group of the OECD Working Group on Pesticides. These Seminars focus on key issues in pesticide risk reduction of concern to OECD governments. The Seminars are intended to provide an opportunity for OECD governments to discuss the issues together with non-governmental stakeholders and to develop recommendations for further OECD activities.

After a series of presentations on governments' and other stakeholders' approaches with aerial application (copies of all presentations are in Annex 3), the Seminar discussed the various issues associated with pesticide aerial application, such as risks and benefits, technical developments, and communication and information aspects. The Seminar recommended that the OECD promote information exchange on aerial application and develop a code of best/good practices for aerial application.

The draft report of the Seminar was approved out-of-session by the Working Group on Pesticides by written procedure that was finished on 20 March 2010.

This document is being published under the responsibility of the Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, which has agreed that it be unclassified and made available to the public.

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## INTRODUCTION

1. This report presents the results and recommendations of an OECD Seminar on ways to achieve pesticide risk reduction through better national risk management strategies for aerial application. This one-day Seminar, held on 24 February, 2009 was chaired by Wolfgang Zornbach (Germany), Chairman of the OECD Risk Reduction Steering Group (RRSG), and took place in San Francisco, United States (US).

2. The US Environmental Protection Agency (US-EPA) planned and organized this Seminar as well as the field trip that took place the day before in the San Joaquin Valley, California. The field-trip day comprised several visits, including a stop at a small ‘agricultural airport’ where a presentation on issues dealing with aerial application and a demonstration of on-site research on aerial pesticide drift (using a wind tunnel) were given to OECD participants. The field trip proved very helpful in the context of the RRSG Seminar that took place immediately the day after.

3. This Seminar was the tenth in a series of Seminars organised by the OECD Pesticide RRSG, a sub-group of the OECD Working Group on Pesticides (a group composed primarily of representatives of the 30 OECD governments but that also includes representatives of the European Commission and other international organisations, the pesticide industry, and the environmental community). RRSG Seminars focus on key issues in pesticide risk reduction of concern to OECD countries. The Seminars are intended to provide an opportunity for OECD governments to discuss these issues together with non-governmental stakeholders and to develop recommendations for further follow-up OECD activities. The OECD Pesticides Programme has made great accomplishments toward helping national governments coordinate the efficiency and effectiveness of pesticide risk reduction work, in part because of Seminars such as the one held in San Francisco.

4. Past OECD Risk Reduction Seminars are listed below:

| <b>Title of Seminar</b> [references of publication]  | <b>Date</b>      | <b>Place</b>               |
|--|------------------|----------------------------|
| <b>Compliance and Risk Reduction</b><br><i>ENV/JM/MONO(2004)6</i> (Series on Pesticides No. 24)  | 10 March<br>2003 | Paris, France              |
| <b>Minor Uses and Pesticide Risk Reduction</b><br><i>ENV/JM/MONO(2005)4</i> (Series on Pesticides No. 26)  | 4 Nov. 2003      | Canberra,<br>Australia     |
| <b>Pesticide Risk Reduction through Good Container Management</b><br><i>ENV/JM/MONO(2005)12</i> (Series on Pesticides No. 28)                                  | 22 June 2004     | Bonn, Germany              |
| <b>Risk Reduction through Good Pesticide Labelling</b><br><i>ENV/JM/MONO(2006)13</i> (Series on Pesticides No. 29)   | 1 March 2005     | Paris, France              |
| <b>Pesticide Risk Reduction through Better Application Technology</b><br><i>ENV/JM/MONO(2007)3</i> (Series on Pesticides No. 35)                               | 30 Nov. 2005     | Wellington, New<br>Zealand |
| <b>Joint OECD/EC Seminar on Harmonised Environmental Indicators For Pesticide Risk (HAIR)</b><br><i>ENV/JM/MONO(2007)27</i> (Series on Pesticides No. 40)      | 13 Nov. 2006     | Bonn, Germany              |
| <b>Risk Reduction through Better Worker Safety and Training</b><br><i>ENV/JM/MONO(2008)9</i> (Series on Pesticides No. 42)                                     | 21 March<br>2007 | Brno, Czech<br>Republic    |
| <b>Risk Reduction through Education / Training the Trainers</b><br><i>ENV/JM/MONO(2009)35</i> (Series on Pesticides No. 45)                                    | 15 Nov. 2007     | Mexico City,<br>Mexico     |
| <b>Risk Reduction through Spray Drift Reduction Strategies as Part of National Risk Management</b><br><i>ENV/JM/MONO(2009)36</i> (Series on Pesticides No. 46) | 12 June 2008     | Paris, France              |

The reports from these Seminars are available on the OECD public web site at: <http://www.oecd.org/env/pesticides>, under the section “Risk Reduction.”

5. Members of the RRSB selected “aerial application” as the topic of this Seminar considering its significance for pesticide risk reduction in the fields of human health and the environment. The importance of adopting risk management strategies for aerial application was noted during earlier OECD Seminars and surveys:

- The Seminar on Better Application Technology discussed opportunities for risk reduction through better pesticide application technologies and methods. It considered a variety of technology approaches for aerial and other methods of pesticide applications, benefits of those options, and how pesticide applicators and regulatory authorities depended on those approaches for risk reduction. It also reviewed regulatory (e.g., policies, laws, and equipment inspections) and voluntary (e.g., spray drift management guidelines) mechanisms that exist, which address the issue.
- The Seminar on Spray Drift considered several approaches to reduce risks associated with drift, including that arising from aerial application. Strategies included inter alia setting buffer zones or adopting drift reduction technologies.
- The importance of reducing aerial spray drift was also highlighted in the Second Risk Reduction Survey conducted in 2004-2005 (ENV/JM/MONO(2006)14).

## PARTICIPANTS

6. People attending the OECD Seminar included:

- Representatives of the pesticide regulatory authorities of OECD countries (Australia, Canada, Germany, Japan, the Netherlands, New Zealand and US)
- Representatives from industry, including CropLife International (the international association of pesticide manufacturers), BIAC (Business and Industry Advisory Committee to the OECD) and IBMA (International Biocontrol Manufacturers Association)
- Officials from international organisations, such as the European and Mediterranean Plant Protection Organization (EPPO)
- International experts engaged in programmes dealing with aerial application from other key stakeholder groups such as environment non-governmental organisations (Pesticide Action Network North America) and national aerial applicator organisations (National Agricultural Aviation Association (US)).

7. A participant list is provided in Annex 2.

## **PURPOSE AND SCOPE OF THE SEMINAR**

8. The main objectives of the Seminar included:

- to identify key issues and challenges of pesticide risk reduction from aerial applications, especially spray drift management
- to provide updates of national and international legislative and non-legislative activities and initiatives for requiring or promoting the adoption of aerial application drift reduction technologies by farmers and other pesticide users to reduce risks from using agricultural pesticides
- to exchange information on OECD countries' current activities in the area of aerial application risk reduction
- to suggest and discuss options of further steps for OECD countries and key stakeholders in OECD and non-OECD countries to address the identified issues
- to recommend possible further steps for OECD.

9. In particular the following issues were presented during the Seminar:

- Training and certification programs on aerial spraying
- National regulations and schemes for risk reduction for aerial spraying
- Special requirements for aerial spraying equipment and pesticides used
- New application technologies and approaches for managing drift from aerial application
- Protecting workers, communities and sensitive sites
- Recommendations for improving aerial drift management.

## **STRUCTURE OF THE SEMINAR**

10. The first part of the Seminar in the morning was devoted to informative presentations from governments and other stakeholders. The second part in the afternoon consisted of roundtable discussions that built on issues that arose from morning presentations, and recommendations for the OECD. The Seminar Programme is provided in [Annex 1](#).

## GOVERNMENT AND STAKEHOLDER EXPERIENCE & PERSPECTIVES WITH AERIAL APPLICATION

11. Following an initial presentation on training and certification of aerial applicators in the US, government representatives of Australia, Germany, New Zealand and the European Commission presented their experiences and recent initiatives with aerial application in their own countries/regions. Then representatives of the industry (pesticide manufacturers) and NGOs presented their perspectives, actions and concerns related to aerial spraying.

12. Below are listed the main topics covered in the presentations. More detailed information can be found in the slides of presentations that are grouped in [Annex 3](#).

- *Reasons for treating by air* (e.g., treat large surfaces quickly, reach difficult terrains with impossible access by ground, prevent soil compaction, prevent damage to crops by not disrupting foliage, deal with wet soil conditions, respond to urgency situations, reduce cost)
- *Importance of education and training of aerial applicators* (development of specific educational programmes focusing on safety, maintenance/security and drift mitigation approaches leading to reduced number of aviation accidents and drift incidents associated with aerial application)
- New technologies to improve aerial spraying and to make applications more precise and efficacious, thus reducing pesticide risks (such as GPS-assisted aircrafts, use of smokers, electrostatic nozzles, air-induction nozzles replacing hollow cone nozzles that present a higher drift potential)
- *Recent developments in pesticide and environmental legislations* (in the European Union, the new “Framework directive on the sustainable use of pesticides” will generally ban aerial spraying from 2012 onwards. Derogations will however be possible in certain limited cases where clear advantages or no viable alternatives exist and under certain conditions - pesticides approved for aerial spraying; operator holding a certificate; sprayed area not in close proximity to residential areas; aircraft equipped with best available technology; emergency situations. Spraying steep vineyards – with helicopters - and forests were presented as possible derogation cases)
- *Aerial spray drift trials and modelling*, (importance of generating aerial drift trials, of deriving basic drift values and scenarios specific for aerial application – those for ground applications not being valid, of developing by-stander exposure models; use of spray drift reduction software such as AgDRIFT to estimate drift deposition)
- *Need for international collaboration in research* (on aerial drift modelling, droplet size modelling, application technology)
- *Product label restrictions* (statements to impose no-spray/buffer zones, to forbid application under certain wind conditions, to recommend spray drift reduction techniques, to use largest spray droplet size compatible with efficacy)

- *Communication and information aspects* (notification messages to residents and bystanders, community concerns with aerial spraying over/near homes and public sites)
- *Compliance and enforcement issues* (illegal applications, problematic “legal” applications, weak enforcement, loss of organic farming certification due to aerial drift, double standard for developed and developing countries).

## ROUNDTABLE DISCUSSION

13. Following the presentations reviewing the existing programmes in OECD countries and among various stakeholders, the floor was opened to all Seminar participants for a roundtable discussion. The following points guided the discussion:

- Key issues and challenges of pesticide risk reduction from aerial applications
- Barriers to and solutions for the development of aerial spray drift reduction technologies
- Regulatory requirements that exist in different countries, and existing guidance and other voluntary measures concerning aerial spray drift reduction
- Good practices and innovative approaches
- Opportunities for further development for all stakeholders

14. All participants made knowledgeable interventions which contributed to a better understanding of the issues associated with aerial application and helped the group reach recommendation on follow-up steps for OECD on this topic.

## SEMINAR RECOMMENDATIONS AND FINDINGS

### *Risks associated with aerial spraying*

15. First, it was recognised that aerial application may be seen as potentially riskier than other forms of applications. Spraying is quicker and therefore whenever there are mistakes they are happening on a larger scale. Also, the pilot may have more difficulties to see the residents around the sprayed fields.

16. On the one hand, some risks were said to be *specific* to this type of application. Risks arising from aerial application are more difficult to control for by-standing communities (information to them is key) and for aquatic/terrestrial environments. Also, spraying over neighbouring crops, whether because of aerial drift or because of wrong/inaccurate applications, could generate problems (e.g. withdrawal of organic farming accreditation). In these cases, the answers are also specific: specific training/guidance for aerial application, specific modelling research on drift/deposition and droplet size, specific regulations (e.g. general ban in the European Union with possible derogations) including labels.

17. On the other hand, some risks associated with aerial application were *not* considered *specific*. For example, pesticide mix loading/cleaning procedures do not differ significantly from other types of application. In general, similar issues dealing with pollution from with point sources are encountered.

18. Some participants stressed that it was important not to damn one method of application compared to others. Each method presents inherent advantages and disadvantages and regulatory agencies regulate each at its optimal risk management level, using label restrictions, modelling and data information, etc.



Finally, it was recognized that there are some possibilities of shifting risks from one method to another. For example, when condemning/banning aerial application, this would imply, in certain situations, more incidents if ground application were used instead (e.g. for worker safety).

### ***Benefits of aerial spraying***

19. Aerial application demonstrates clear advantages in certain situations. It enables quicker applications (e.g. on large surfaces such as forests, cotton, soybean or in case of emergency/outbreaks) that lead to immediate cost savings. Also areas that are difficult to reach by ground can be accessed and treated by air (e.g. trees, bananas, palms).

### ***Technical developments***

20. A number of risk reduction technologies were reviewed and encouraged:

- **Air-induction nozzles** to reduce spray drift
- **GPS techniques** to guide aircraft pilots on the tracks
- **Electrostatic nozzles.** Such devices induce the chemical droplets with either a positive or negative charge before their release over the target. Charged aerial sprays are attracted to targeted objects such as crops, trees and other plants. Electrostatic nozzles can be very beneficial in aerial application because less drift seem to happen, less pesticide mix is used per sprayed area, hence larger areas are treated per load, meaning less fuel used. But some concerns were expressed with this technique: in some case, product penetration on the leaves could be reduced.
- **Innovative approaches** such as reverse venture devices, lower speed aircrafts (to limit turbulence and vortex effects), drone/remote control aircrafts (to reduce risks for the pilot/operator), laser/camera controlled systems.

### ***Communication and information***

21. Communication was seen as a key factor for risk reduction. Good exchange of information should take place between residents and growers, in an open and transparent way (right-to-know issue). Education and training (primarily for applicators and ideally also for the neighbouring communities on a voluntary basis) specific to aerial application is essential.

### ***IPM (Integrated Pest Management)***

22. Wherever possible, IPM good practices were again encouraged as a way to reduce pesticide risk reduction.

*Specific regulations*

23. As mentioned above (paragraphs 16 and 18), specific regulations are needed to cover aerial application and its specific risk profile(s).

*Recommendations for possible further OECD work*

24. The main recommendation concerning OECD's potential role was two-fold:

- **to promote information exchange on aerial application**
- **to develop a code of best/good practices for aerial application.**

25. The recently-established OECD Network of Experts on Spray Drift (NESD) was seen as the right body to promote and facilitate information exchange on aerial application, in particular as it relates to spray drift management. In a first phase, the NESD would collect existing documents from regulatory authorities on aerial application (on spray drift reduction aspects, but also on e.g. current research, methodologies, up-to-date practices, guide books). Information collected would be posted on the NESD website that is expected to be ready in the first half of 2010.

26. The development of a code of best/good management practices for aerial application could take place in a second phase, if deemed useful by the RRSB, depending on the information collected during the initial phase. NESD members could draft a short document of the generic or basic important elements for a best management plan (BMP) for spray drift management for aerial applications. These elements would be based on existing countries' BMPs that would have been collected during the first phase. The use of the basic OECD BMP would be for countries that may not have their own BMPs and wish to develop their own.

## ANNEX 1

**OECD SEMINAR ON PESTICIDE RISK REDUCTION THROUGH BETTER  
NATIONAL RISK MANAGEMENT STRATEGIES FOR AERIAL APPLICATION**

**24 February 2009, San Francisco, US**

**SEMINAR PROGRAMME**

**Chair: Wolfgang Zornbach, Germany**

|           |  |
|-----------|--|
| 9.00 a.m. | <p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>• <b>Opening remarks – EPA Region 9:</b> <i>Kathy Taylor, Associate Director of the Communities and Ecosystems Division</i></li> <li>• <b>Welcoming remarks – US-EPA:</b> <i>Jay Ellenberger, Associate Director Field and External Affairs Division, Office of Pesticide Programs</i></li> <li>• <b>Purpose and structure of the seminar - Chair</b></li> <li>• <b>Tour de table</b> to introduce participants</li> </ul>             |
|           | <p><b>Training &amp; Certification of Aerial Applicators on Drift Management</b></p> <ul style="list-style-type: none"> <li>• <b>USA:</b> <i>Education/Training Program of Aerial Applicators</i> (Randy Hale, National Agricultural Aviation Association (US))</li> <li>• <b>Other countries are invited to make presentations and share experiences</b></li> </ul>   |
|           | <p><b>Government Regulatory Initiatives, Experience and Perspectives</b></p> <ul style="list-style-type: none"> <li>• <b>European Commission:</b> <i>Framework Directive</i> (Wolfgang Zornbach, Germany, on behalf of the EC)</li> <li>• <b>Australia:</b> <i>Spray Drift Risk Assessment and Regulation at the APVMA</i> (David Loschke, Australian Pesticides and Veterinary Medicines Authority)</li> <li>• <b>Other countries are invited to make presentations on their experiences</b></li> </ul> |

|           |  |
|-----------|--|
|           | <p><b>Aerial Application Equipment and Other Technologies for Drift Management</b></p> <ul style="list-style-type: none"> <li>• <b>Australia/New Zealand:</b> <i>Modelling Drift and Droplet Size for Aerial Application</i> (Andrew Hewitt / Warren Hughes)</li> <li>• <b>Germany:</b> <i>Helicopter Drift Trials in Germany</i> (Dirk Rautmann, Institute for Application Techniques in Plant Protection)</li> <li>• <b>CropLife International:</b> <i>Why aerial spraying? - the reasonable case for this type of application</i> (Keith Jones, Director of Stewardship of CropLife International)</li> </ul> |
|           | <p><b>Perspectives from the Public on Aerial Applications</b></p> <ul style="list-style-type: none"> <li>• <b>PAN:</b> <i>Drift from Aerial Spraying: The View from the Other Side of the Fence</i> (Susan Kegley, Pesticide Action Network North America)</li> </ul>  |
|           | <p><b>Round-table Discussion</b></p> <ul style="list-style-type: none"> <li>• Regulatory requirements that exist in different countries, and existing guidance and other voluntary measures concerning aerial spray drift reduction</li> <li>• Economic aspects related to innovation and adoption of aerial spray drift reduction technologies</li> <li>• Good practices and innovative approaches</li> <li>• Barriers to and solutions for the development of aerial spray drift reduction technologies</li> <li>• Opportunities for further development for all stakeholders</li> </ul>                       |
|           | <p><b>Summary of the Discussion, Ideas for Follow-up, Recommendations for possible further OECD work</b></p>   |
| 5.00 p.m. | End of the Seminar   |

**ANNEX 2**

**OECD SEMINAR ON PESTICIDE RISK REDUCTION THROUGH BETTER  
NATIONAL RISK MANAGEMENT STRATEGIES FOR AERIAL APPLICATION**

**24 February 2009, San Francisco, US**

**LIST OF PARTICIPANTS**

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