



Bundesanstalt für Arbeitsschutz  
und Arbeitsmedizin

# **Comparative Study on Dermal and Inhalation Exposure of Workers and Bystanders During Pest Control of Oak Processionary Moth (OPM) by Spray Application**

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## Oak Processionary Moth (OPM)

- native to central and southern Europe
- range of distribution is expanding
- caterpillars form stinging hairs starting with 3<sup>rd</sup> larval stage
- hazard to human health
  - skin and eye irritation
  - breathing difficulty
  - allergic reaction



Warning sign near Lüneburg, May 2014  
“Warning, Oak Processionary Moth,  
don’t touch caterpillars or nests”

# Oak Processionary Moth (OPM)

- **control of OPM**
  - Insecticides (spray application)
  - removal of nests by suction
- **control of OPM to protect human health: biocides-legislation**
- **risk assessment is part of the authorisation process**
  - risk for workers: comparison of **estimated exposure levels** with reference values



Nest from previous year, April 2014

photo: BAUA



# Control of OPM by Spray Applications



vehicle-mounted spraying device



hand-held spraying device

photos: BAuA

## Exposure Assessment of OPM Control

- **no specific exposure data was available**
  - **applicability of exposure models developed for plant protection products (PPP)?**
    - crops significantly smaller than oaks
      - focus on different spraying devices
      - different spraying patterns
    - different general conditions
      - (groups of) trees approached individually
- assessment of OPM control based on PPP data would bear a high level of uncertainty!**

## Project Organisation

### – **project management**

- BAuA, unit 4.1 „Exposure Scenarios“

### – **measurements and analysis**

- inhalation exposure: BAuA, unit 4.4  
“Measurement of Hazardous Substances“
- dermal exposure: IPASUM, University of Erlangen-Nuremberg
- field trials: April/May 2014 + 2015

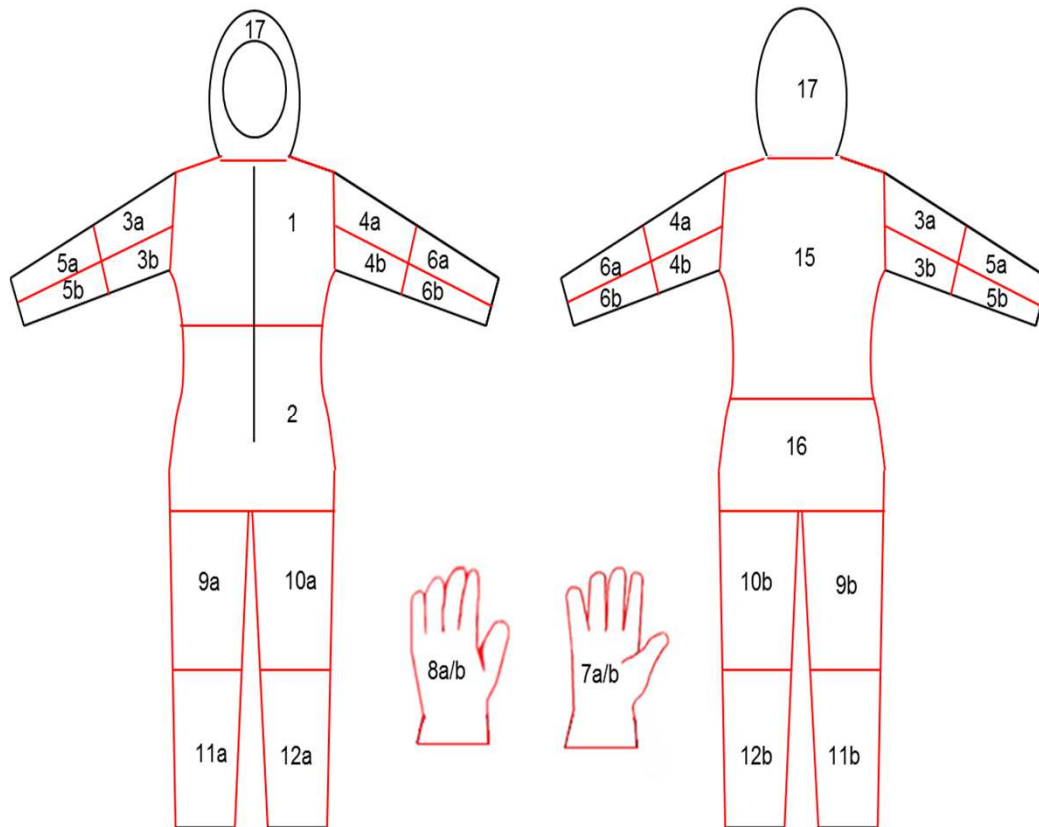
## Sampling Strategy: Inhalation



photos: BAuA



# Sampling Strategy: Dermal



picture: IPASUM



photo: BAUA



# Results: Vehicle-mounted Spraying Devices

## exposure patterns during preparation of the application liquid

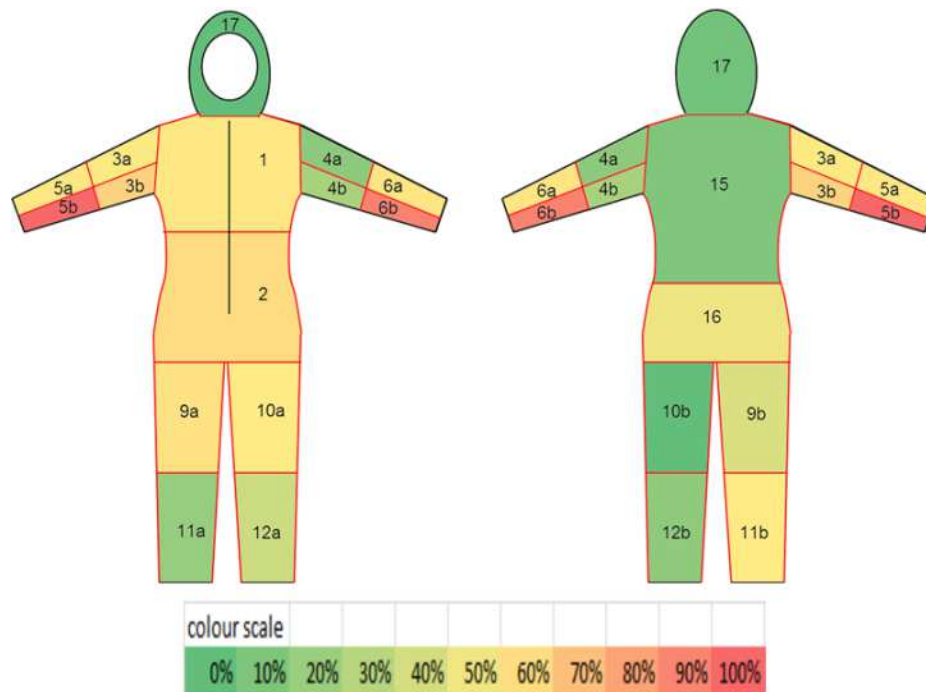


photo: BAuA

# Results: Hand-held Spraying Devices

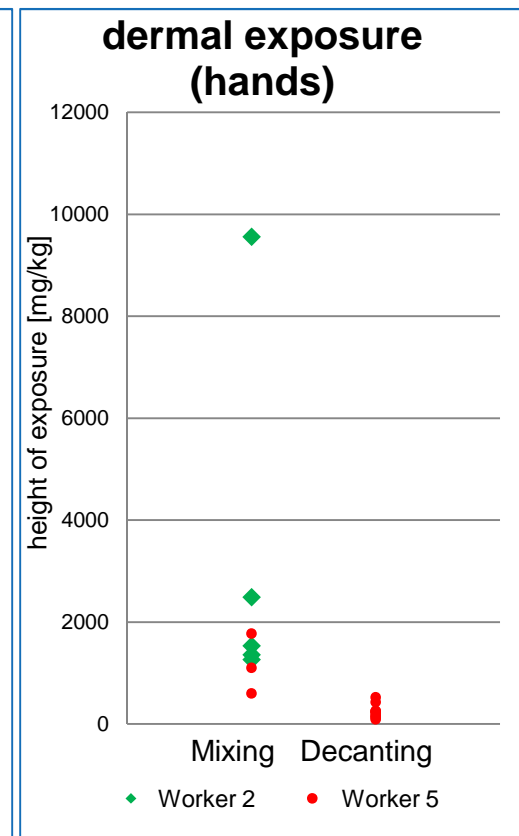
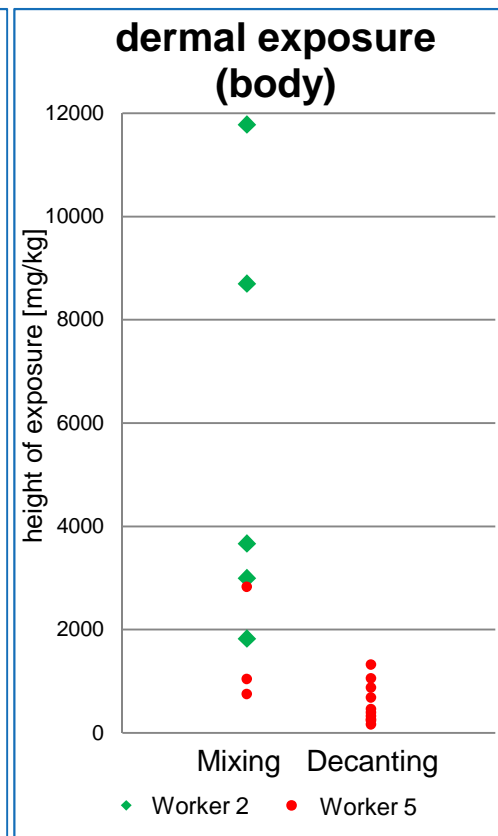
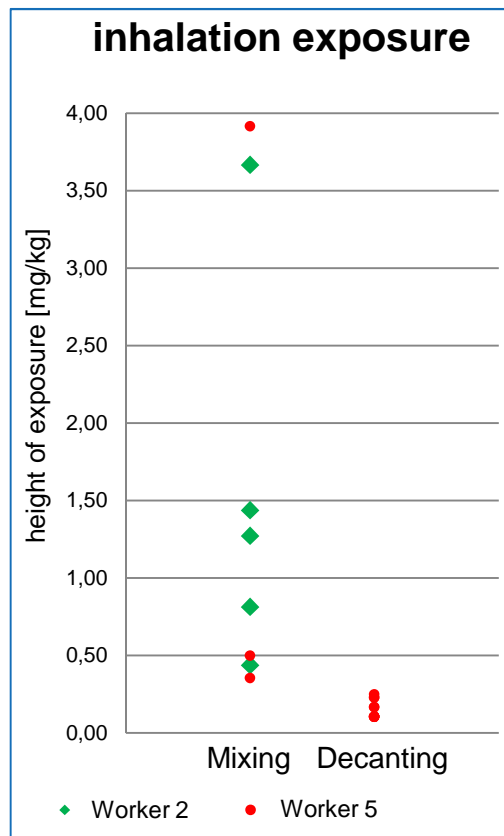
comparison: mixing application liquid vs decanting from the tank (presented data include application!)



Mixing



Decanting



# Results: Hand-held Spraying Devices

## exposure patterns resulting from hand-held spraying

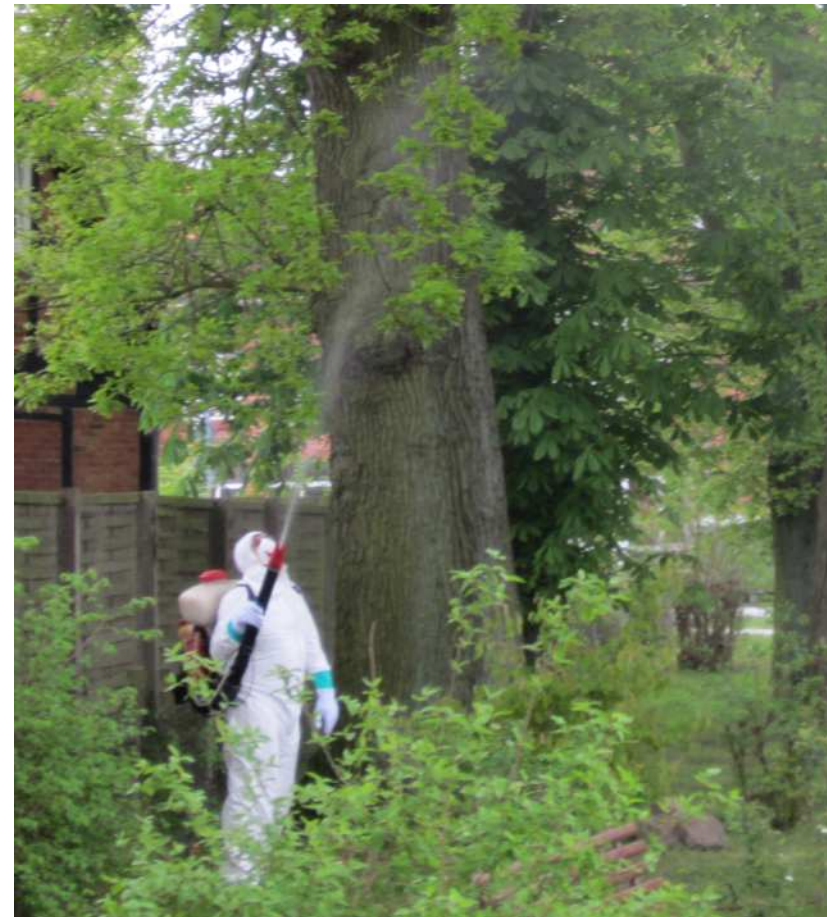
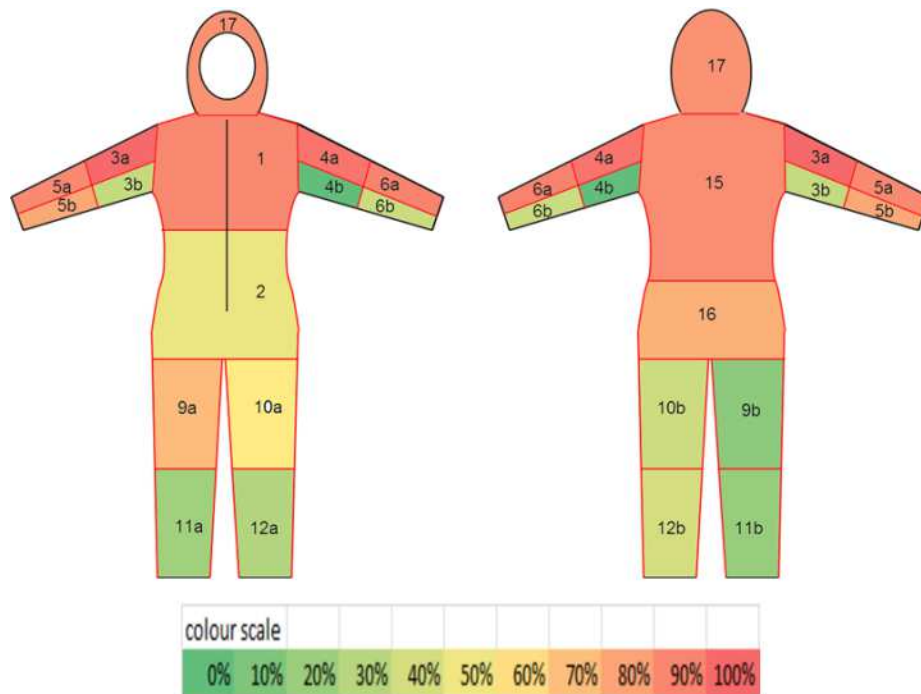
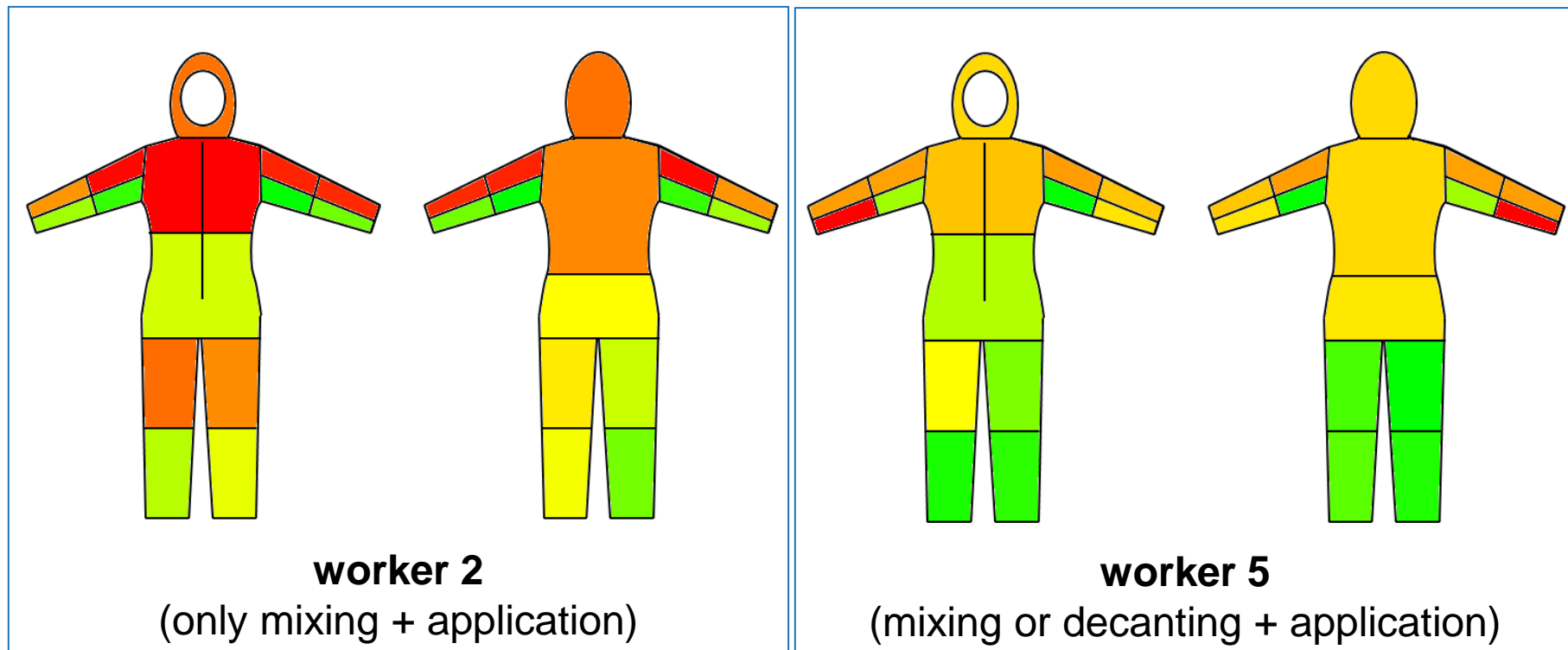


photo: BAuA

## Results: Hand-held Spraying Devices

exposure patterns resulting from hand-held spraying:  
personal behaviour



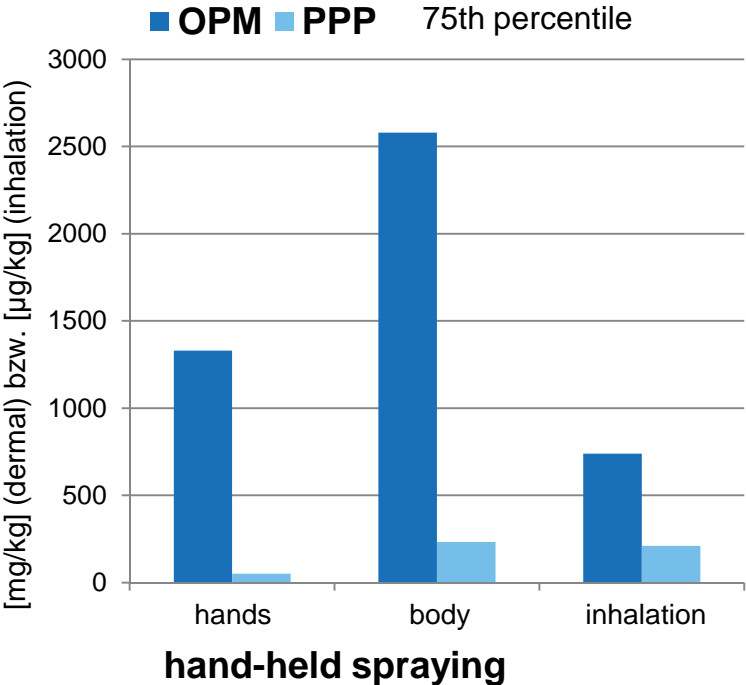
pictures: IPASUM



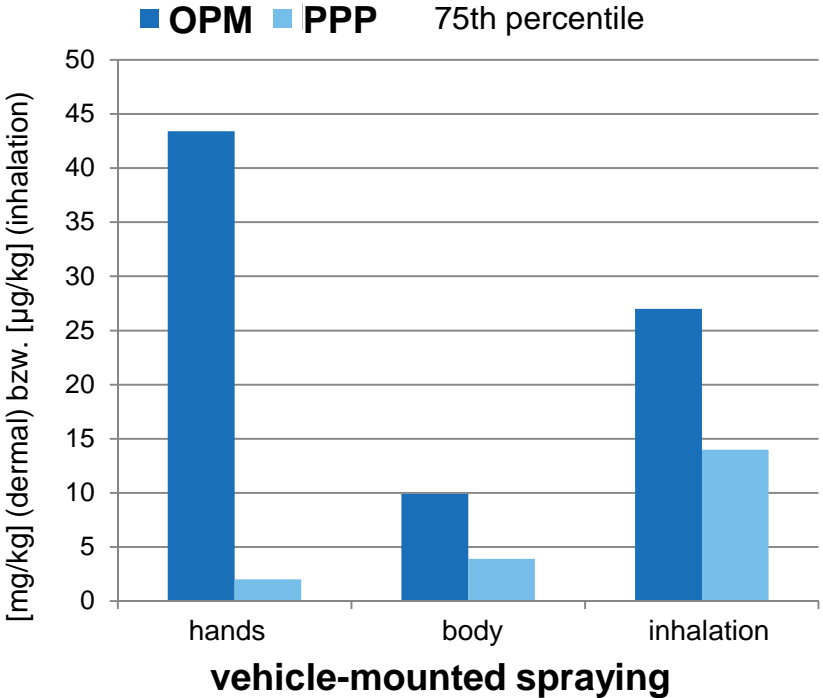
# Comparison Between OPM Control and PPP Models

- comparison with data from AOEM:\*

- hand-held spraying
  - M&L: knapsack all
  - App: HCHH all



- vehicle-mounted spraying
  - M&L: ML tank WG
  - App: HCTM cabin



\* Joint development of a new Agricultural Operator Exposure Model - Project Report. Federal Institute for Risk Assessment (BfR), 2013

## Summary

- **specific data for exposure assessment of OPM control**
- **sufficiently comprehensive database for authorisations under the BPR for**
  - vehicle-mounted spraying
  - hand-held spraying
  - accompanying activities: weighing/packing, cleaning
- **some results:**
  - mixing and loading phase contribute significantly to the overall exposure
  - exposure depends significantly on different approaches and personal behaviour
  - major differences to exposure seen in PPP applications

# Thank You for Your Attention!

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The project report will be made available in German and in English on our webpage:

**[www.baua.de](http://www.baua.de)**

Please use search function with the project number:

**F 2343**

