

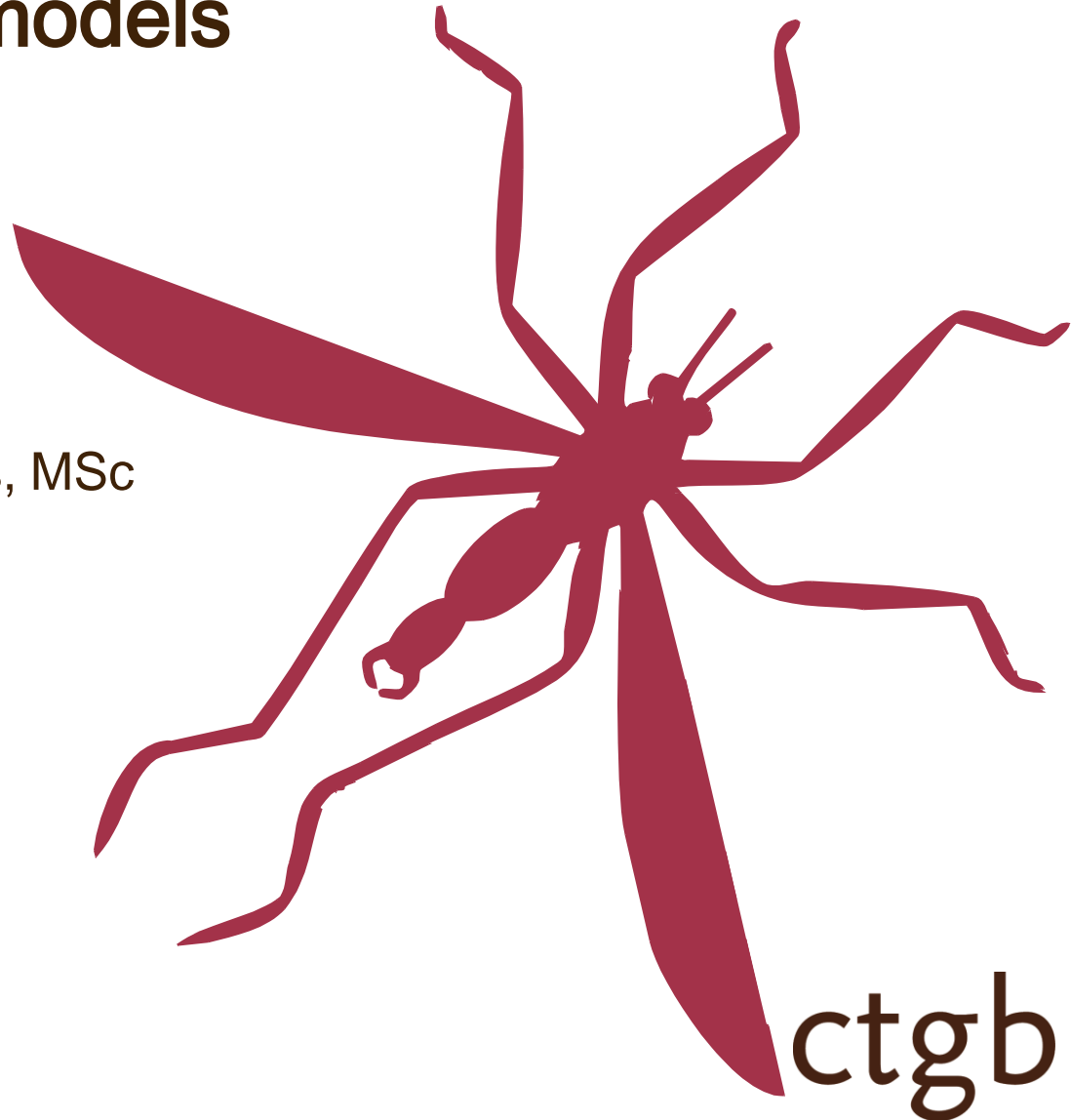
Introduction to operator exposure estimation models

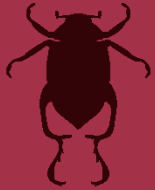


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Products and
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Introduction

- Exposure scenarios:
 - Operators: persons involved in the mixing/loading and application of a PPP
 - Workers: persons who enter an area or handle crop previously treated with a PPP
 - Bystanders: persons who are located within or directly adjacent to the area where PPP application is taking place or has recently been completed.



Exposure models: operator



- EUROPOEM
- German model
- UK POEM
- NL model
- NL and Southern Greenhouse
- NA PHED
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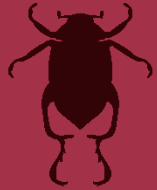




Exposure models: operator



Evaluation of available exposure models:



EFSA Project to assess current approaches and knowledge with a view to develop a Guidance Document for pesticide exposure assessment for workers, operators, bystanders and residents.

<http://www.efsa.europa.eu/en/scdocs/doc/26e.pdf>





Exposure models: operator



- In EU mainly three basic models:
 - UK-POEM
 - German model
 - NL model



Developed in isolation





Exposure models: operator

EUROPOEM

- Developed in Europe by representatives from industry, government and research institutes.
- Includes data from UK-POEM, German, NL model etc
- Exposure can be estimated for wettable powder (WP), wettable granules (WG) or liquid formulations.
- Exposure scenarios:
 - Vehicle equipment: downward and upward
 - Hand-held equipment outdoors: downward and upward
 - Hand-held equipment indoors: only for liquids, mixing/loading and application exposure combined.
- No PPE = long-sleeved shirt and long trousers, shoes and socks



Exposure models: operator



German model

- Developed by German industry and regulatory authority
- Wettable powder (WP), wettable granules (WG) and liquids
- Exposure scenarios:
 - Vehicle equipment: downwards and upwards
 - Handheld equipment: upwards only
 - Home and garden
- Geometric mean
- Underlying database relatively small for mixing/loading of WP and WG and for downward spraying with tractor-mounted equipment.
- No PPE = moderately dressed with shoes and socks, half of upper arms, forearms, thighs and lower legs unprotected



Exposure models: operator



UK POEM

- Developed by UK industry and regulatory authorities
- wettable powder (WP), wettable granules (WG), water soluble bags (WB) and liquid formulations
- Exposure scenarios:
 - Vehicle equipment: downwards and upwards
 - Handheld equipment: downwards and upwards
 - Home garden low level spraying
- 75th percentile
- Updated with data from EUROPOEM and PHED
- No PPE = single layer of work clothing for professional use, T-shirt and shorts for home garden use.



Exposure models: operator



NL greenhouse

- Developed by Dutch authorities
- Manual spraying assumed
- No distinction between up- and downwards spraying
- 90th percentile used
- Exposure during mixing/loading and applications not separated



Exposure models: operator



Southern European glasshouse

- Developed by industry (ECPA), modern GLP studies
- Wettable powder (WP), wettable granules (WG) and liquids
- Large spray tank with hose connected to a hand-held spray gun or lance
- Exposure scenarios:
 - Handheld high crop standard scenario
 - Handheld high crop intensive contact scenario
 - Handheld low crop standard scenario
 - Handheld low crop intensive contact scenario
- 75th percentile used.
- No PPE = shoes, socks and standard working coverall

Exposure models: operator



NL model:

- Developed by Dutch Authorities
- Exposure scenarios intended:
 - Vehicle equipment: up- and downward
 - Indoors spraying
- 90th percentiles used (conservative)
- Limited database
- Recommended only for use to estimate dermal and respiratory exposure during mixing/loading of powders and granules, and respiratory exposure during mixing/loading for liquids.



Exposure models: operator

PHED (Pesticide Handlers Exposure Database)

- Developed by N. American Industry, EPA & Health Canada
- Liquids and solids, including fry-flowable materials, dusts, wettable powders and granules.
- Application scenarios, e.g.:
 - vehicle up- and downwards
 - hand-held up- and downwards (field)
 - hand-held (green-house)
 - paint brush
 - aerosol can
 - aerial
- No PPE = long pants, short sleeves, shoes, socks



Exposure models: operator



PHED (cont'd)

- Model difficult to use
- Studies are dated (up to 30 years)
 - Do not meet current guidelines
 - Modern spraying equipment not adequately represented
- Software platform no longer available
- Replacement (AHED) in development.





Which model to select for operator exposure?

- Depends on type of application:
 - Indoors vs outdoors
 - Manual vs mechanical
 - Upwards vs downwards
- No consensus on which model to use for which situation.



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Which model to select for operator exposure – NL requirements



Activity/formulation		Scenario	Preferred model (NL)	
			Dermal	Inhalatoir
Mixing/ loading	Liquid	Mechanical	EUROPOEM	EUROPOEM
		Manual	EUROPOEM	NL model
	Powder	Mechanical	NL model	NL model
		Manual	NL model	NL model
	Granules	Mechanical	NL model	NL model
		Manual	NL model	NL model
Spraying (field)		Mechanical up	EUROPOEM	EUROPOEM
		Mechanical down	EUROPOEM	EUROPOEM
		Manual up	German	German
		Manual down	UK-POEM	UK-POEM
Spraying (greenhouse)		Manual up and down	NL Greenhouse	NL Greenhouse



Which model to select for operator exposure?



Within Europe

- UK-POEM
- German model (except for manual downward spraying)



Outside Europe:

- PHED surrogate exposure guide (awaiting replacement with AHED)





New developments within Europe



EFSA (European Food Safety Authority)

Scientific Opinion on Preparation of a Guidance Document on Pesticide Exposure Assessment for Workers, Operators, Bystanders and Residents

www.efsa.europa.eu/en/efsajournal/doc/1501.pdf





References

- German model:
http://www.bvl.bund.de/EN/04_PlantProtectionProducts/11_Applicants/02_AuthorisationProcedure/06_Toxicology/PlantProtectionProducts_toxicol_no_de.html
- UK POEM:
<http://www.pesticides.gov.uk/guidance/industries/pesticides/topics/pesticide-approvals/pesticides-registration/applicant-guide/updates/updates-to-the-uk-poem-operator-exposure-model>
- NL model, NL greenhouse, EUROPOEM:
www.ctgb.nl click on “full text and Guidance documents” under “Regulation placing of ppp on the market”

Background information



- **EFSA Guidance on the assessment of exposure** for operators, workers, residents and bystanders in risk assessment for plant protection products
<http://www.efsa.europa.eu/en/efsajournal/doc/1501.pdf>
- **EFSA Project to assess current approaches** and knowledge with a view to develop a Guidance Document for pesticide exposure assessment for workers, operators, bystanders and residents.
<http://www.efsa.europa.eu/en/scdocs/doc/26e.pdf>
- **UK CRD website**
<http://www.pesticides.gov.uk/guidance/industries/pesticides/topics/pesticide-approvals/pesticides-registration/data-requirements-handbook/toxicity-working-documents>
- **German BVL website**
http://www.bvl.bund.de/EN/04_PlantProtectionProducts/11_Applicants/02_AuthorisationProcedure/06_Toxicology/PlantProtectionProducts_toxicol_no_de.html