

Assessment of side-effects of pesticides on non-target organisms (other than bees) and its transfer into practice

Marlen Heinz & Peggy Marx

Julius Kühn-Institute (JKI)

Institute for Ecological Chemistry,

Plant Analysis and Stored Product Protection

(ÖPV)



Assessment of the effects of plant protection products on non-target arthropods

- Evaluation of the effects:


 - labelling of plant protection products as not/slightly/harmful to non-target arthropods

- Experience in the evaluation/labelling of Biorationals

Where can I find the labelling of the effects?

Federal Office of Consumer Protection and Food Safety (BVL)

- Registration report of plant protection products
- data sheet ppp
- Register of plant protection products:

<p>Orangenöl</p> <p>PREV-AM (007474-00/BFA) COMPO Insektenmittel PREV-AM (007474-60/BFA)</p> <p>Wirkstoffgehalt: 60 g/l Orangenöl Formulierung: Emulsion, Öl in Wasser CLP-Verordnung: Achtung GHS07, GHS09 EUH 208-017 Anwenderschutz: E0005-2, SB001, SB110, SF1891, SS Gewässerschutz: NW262, NW264, NW468 Bienenschutz: NW3841 Nutzorganismen: NN2001, NN2002 Sonstiges: VN200 Zulassungsende: 31.12.2026</p> <p>66. Auflage 2018, ISSN 0178-0603</p> <p> Bundesamt für Verbraucherschutz und Lebensmittelsicherheit</p>	<p>Labelling phrases of ppp</p> <table border="1"> <tr> <td>NN1001</td> <td>The product is classified as non-harmful for populations of relevant beneficial insects.</td> </tr> <tr> <td>NN1002</td> <td>The product is classified as non-harmful for populations of relevant beneficial predatory mites and spiders.</td> </tr> </table>	NN1001	The product is classified as non-harmful for populations of relevant beneficial insects.	NN1002	The product is classified as non-harmful for populations of relevant beneficial predatory mites and spiders.				
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NN2512	The product is classified as slightly harmful for populations of the species <i>Orius maiusculus</i> (anthocorid bug).								

Why are the effects of ppp assessed and labelled?

Directive 2009/128/EC

General principles of integrated pest management:

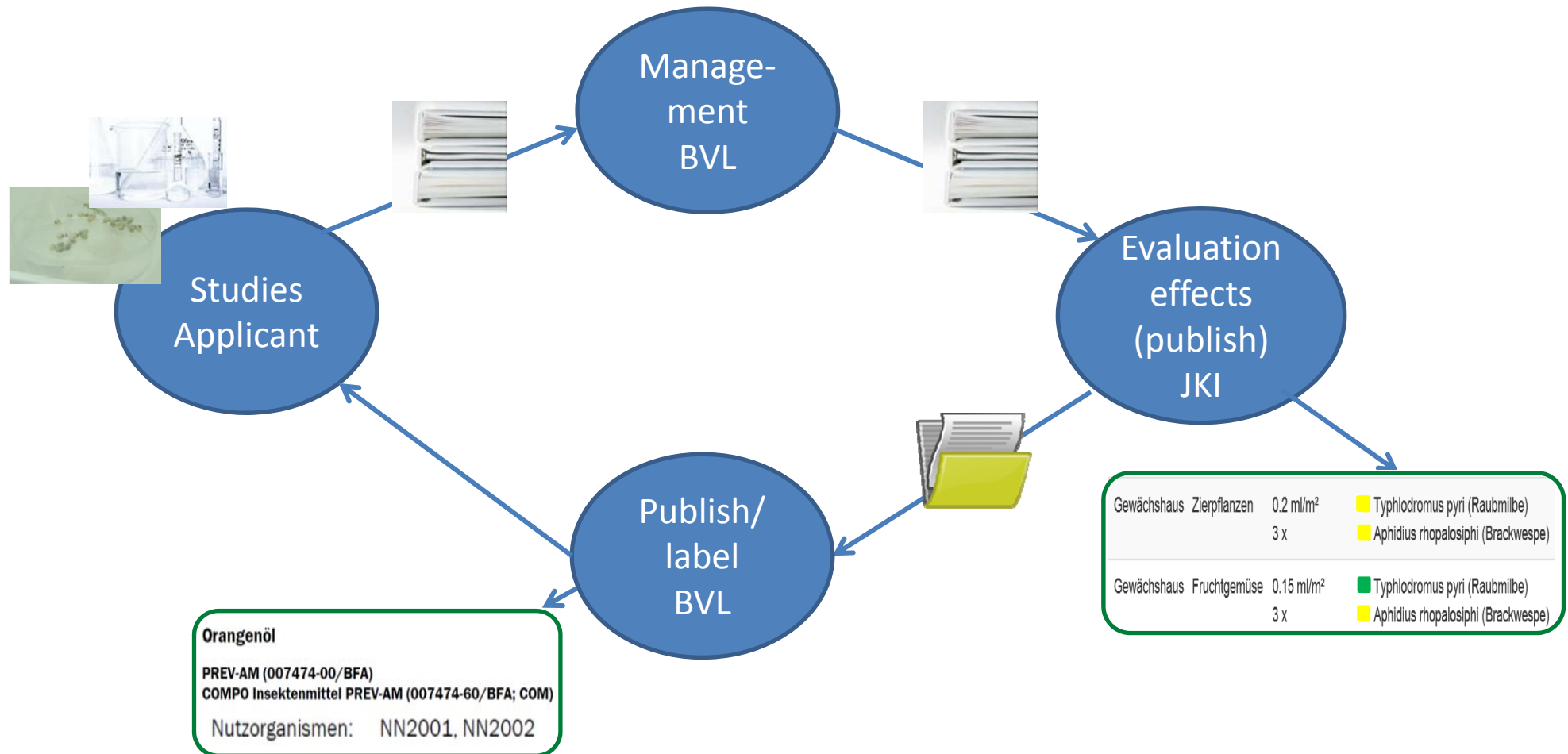
- (1) “The prevention and/or suppression of harmful organisms should be achieved or supported among other options especially by: protection and enhancement of important beneficial organisms, e.g. by adequate plant protection measures or the utilisation of ecological infrastructures inside and outside production sites.“
- (5) „The pesticides applied shall be as specific as possible for the target and shall have the least side effects on human health, non-target organisms and the environment. “

Plant Protection Act

- The general principles of "Integrated Pest Management" and those of "Good Technical Practice" must be observed.
- No unacceptable effects on the ecosystem through the use of pesticides.

How do we get the data?

context of the authorisation procedures for ppp's



Which test guidelines have to be observed?

Joint Initiative (1994): developed and validated test methods

- IOBC (International Organisation for Biological Control),
- BART (Beneficial Arthropod Regulatory Testing Group),
- EPPO (European and Mediterranean Plant Protection Organization)

Candolfi et al. (2000): Guidelines to evaluate side-effects of

plant protection products to non-target arthropods

- test system
- treatments
- validity criteria of the study
- information on testorganism
- test procedure, conditions
- biological observations
- data analysis, reporting



Which species are tested? For which species are there test guidelines?

populations of relevant
beneficial predatory mites and spiders



Typhlodromus pyri

populations of relevant beneficial insects



Aphidius rhopalosiphii

Which species are tested? For which species are test guidelines available?

populations of relevant beneficial predatory mites and spiders

Typhlodromus pyri (predatory mite, *sensitive standard species*)

Spiders of genus *Pardosa* (lycosid spiders)

populations of relevant beneficial insects

Aphidius rhopalosiphi (parasitic wasp, *sensitive standard species*)

Chrysoperla carnea (lacewing)

Poecilus cupreus (carabid beetle)

Aleochara bilineata (rove beetle, staphylinid beetle)

Coccinella septempunctata (ladybird, plant dwelling insect)

Orius laevigatus (predatory bug)

Trichogramma cacoeciae (chalcid wasp)



Which effects are tested?

lethal effects

Corrected Mortality [%]

sublethal effects

food consumption [%]

reproduction [%]

Classification of the effects

laboratory test

extended laboratory test

semi-field conditions

field conditions



artificial

exposure conditions

naturally

lethal/sublethal effects:

classification:

<30%

<25%

= not harmful

30 – 80%

25 – 50%

= slightly harmful

>80%

>50%

= harmful

How are the effects derived from the data?

Example: ppp “Moritz”

Application: ornamentals, greenhouse
 rate : 2L product (60 g/L orange oil) = 120 g a.s./ha orange oil

Table 1: Effects of AB34 (58 g/L orange oil) on beneficial arthropods in laboratory tests on artificial substrates

Species	Substrate	Rate orange oil [g a.s./ha]	Corrected Mortality [%]	Sublethal Effect Reproduction [%]	Reference
<i>Typhlodromus pyri</i>	glass	43	38.4	10.9	211520 (Müller, 2011)
		120	45.4	28.1	
		250	50.6	53.1	
		600	95.0		

<30%	= not harmful
30 – 80%	= slightly harmful
>80%	= harmful

JKI: NN 234 = Moritz is slightly harmful for populations of *Typhlodromus pyri* (predatory mite).

BVL: NN2002 = Moritz is slightly harmful for populations of relevant beneficial predatory mites & spiders.

Example: ppp “Moritz”

Application: ornamentals, greenhouse
 rate : 2L product (60 g/L orange oil) = 120 g a.s./ha orange oil

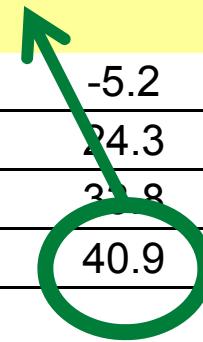
Table 1: Effects of AB34 (56 g/L orange oil) on beneficial arthropods in laboratory tests on artificial substrates

Species	Substrate	Rate orange oil [g a.s./ha]	Corrected Mortality	
				<30% = not harmful
				30 – 80% = slightly harmful
				>80% = harmful

JKI: NN2842 = Moritz is slightly harmful for populations of *Aphidius rhopalosiphi* (braconid wasp).

BVL: NN2001 = Moritz is slightly harmful for populations of relevant beneficial insects.

<i>Aphidius rhopalosiphi</i>	glass	21	-2.4	-5.2	522141 (Meier, 2013)
		38	0	24.3	
		68	6	31.8	
		120	9.6	40.9	



Providing information, informing users

Federal Office of Consumer Protection and Food Safety

- Registration report of plant protection products
- data sheet ppp
- Register of plant protection products:

Orangenöl

PREV-AM (007474-00/BFA)

COMPO Insektenmittel PREV-AM (007474-60/

Wirkstoffgehalt: 60 g/l Orangenöl
Formulierung: Emulsion, Öl in Wasser
CLP-Verordnung: Achtung | GHS07, GHS09 | EUH 208-
Anwenderschutz: E0005-2, SB001, SB110, SF1891, SS-
Gewässerschutz: NW262, NW264, **NW468**
Bienenschutz: NB6641
Nutzorganismen: **NN2001, NN2002**
Sonstiges: NH298
Zulassungsende: 31.12.2026

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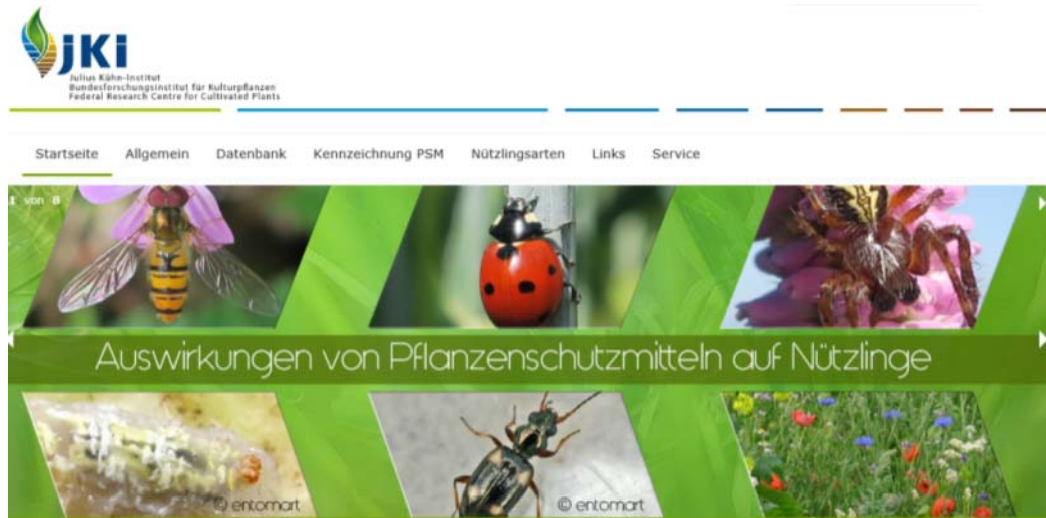
 Bundesamt für
Verbraucherschutz und
Lebensmittelsicherheit

NN2001 The product is classified as slightly harmful for populations of relevant beneficial insects.

NN2002 The product is classified as is slightly harmful for populations of relevant beneficial predatory mites and spiders.




Providing information, informing users




online Database
species-specific labelling



Suche nach Zulassungsnummer:

Suche nach Mittelname:

Providing information, informing users



Suche nach Mittelname:

Moritz

Gewächshaus	Zierpflanzen	0.2 ml/m ² 3 x	■ Typhlodromus pyri (Raubmilbe) ■ Aphidius rhopalosiphi (Brackwespe)
Gewächshaus	Fruchtgemüse	0.15 ml/m ² 3 x	■ Typhlodromus pyri (Raubmilbe) ■ Aphidius rhopalosiphi (Brackwespe)

online Database
species-specific labelling

Signs for the effects:

- not harmful
- slightly harmful
- harmful
- insufficient data



Assessment of the effects of plant protection products on non-target arthropods

- Evaluation of the effects:

 - labelling of plant protection products as not/slightly/harmful to non-target arthropods

- Experience in the evaluation/labelling of Biorationals

Assessment/Labelling of Biorationals



What kind of active ingredients are we talking about?

Microorganisms



- Bacillus thuringiensis* subspecies *kurstaki* Stamm ABTS-351 (Stamm HD-1)
- Bacillus amyloliquefaciens* Stamm QST 713
- Pepino Mosaic Virus Stamm CH2 (Isolat 1906)
- Ampelomyces quisqualis* Stamm AQ 10
- Coniothyrium minitans* Stamm CON/M/91-08
- Pythium oligandrum* M1 (Oomycete)
- ...

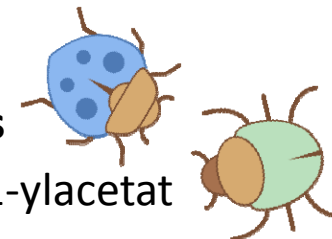
Plant extracts



- Azadirachtin
- Pyrethrine
- Vegetable oils (rapeseed, peppermint, orange...)
- Maltodextrin
-

Semiochemicals

(Z)-9-Dodecen-1-ylacetat



....

Assessment/Labelling of Biorationals



Examples from the online database

Classification scheme:

- not harmful
- slightly harmful
- harmful
- insufficient data

- - Results of studies show effects <25% or 30%
- - because of the selectivity of the product population of relevant beneficial organism are not affected
- - due to the application specified with the registration population of relevant beneficial organism are not affected
(trunk injection, single plant treatment wiping, application in storage)

Assessment/Labelling of Biorationals





Examples from the online database

The product is classified as
'not harmful to relevant :

- beneficial insects
- predatory mites and spiders'

- not harmful
- slightly harmful
- harmful
- insufficient data

Product	Active substance		
XenTari	Bacillus thuringiensis subspecies aizawai ABTS-1857	■	■
CARPOVIRUSINE	Cydia pomonella Granulovirus mexikanisches Isolat	■	■
Contans WG	Coniothyrium minitans CON/M/91-08	■	■
BIOX-M	Spearmint oil	■	■

Assessment/Labelling of Biorationals



Examples from the online database

The product is classified as 'not harmful to populations of the **species**'

- not harmful
- slightly harmful
- harmful
- insufficient data

Species	CARPOVIRUSINE EVO 2 <i>Cydia pomonella</i> Granulov. Isol. GV-R5	■	Dipel ES <i>Bacillus thuringiensis</i> subsp. kurstaki St. ABTS-351	■
<i>Typhlodromus pyri</i> (predatory mite)	NN134	■	NN134	■
<i>Aphidius rhopalosiphi</i> (braconid wasp)	NN1842	■	NN1842	■
<i>Poecilus cupreus</i> (ground beetle)			NN165	■
<i>Chrysoperla carnea</i> (lacewing)			NN170	■
<i>Coccinella septempunctata</i> (ladybird)			NN161	■
<i>Aleochara bilineata</i> (staphylinid beetle)			NN160	■
<i>Pterostichus melanarius</i> (ground beetle)			NN166	■
<i>Trichogramma cacoeciae</i> (chalcid wasp)			NN180	■
<i>Phygadeuon trichops</i> (ichneumonid wasp)			NN181	■
<i>Coccygomimus turionellae</i> (ichneumonid wasp)			NN182	■

Assessment/Labelling of Biorationals







Examples from the online database

The product is classified as ■ not harmful to populations of the **species:**



■ slightly harmful

■ harmful

■ insufficient data

Species	NeemAzal-T/S Azadirachtin	Neem Plus Schädlingfrei Azadirachtin + Rapsöl
<i>Typhlodromus pyri</i> (predatory mite)	NN234 ■ 	NN334 ■ 
<i>Aphidius rhopalosiphi</i> (braconid wasp)	NN1842 ■	NN1842 ■ 
<i>Poecilus cupreus</i> (ground beetle)		NN165 ■
<i>Chrysoperla carnea</i> (lacewing)	NN370 ■ 	
<i>Episyrphus balteatus</i> (hover fly)	NN391 ■	

BVL - group label:

	■	■
	■	■

Assessment/Labelling of Biorationals





Examples from the online database

The product is classified as 'insufficient data' for the **groups** of

- relevant beneficial insects
- relevant beneficial predatory mites and spiders

- not harmful
- slightly harmful
- harmful
- insufficient data

Product(s)	Active Substance		
Blossom Protect; Botector	Aureobasidium pullulans DSM 14940 + Aureobasidium pullulans DSM 14941	■	■
Integral Pro	Bacillus amyloliquefaciens MBI 600	■	■
Gnatrol SC	Bacillus thuringiensis subsp. israelensis (Serotyp H-14) AM65-52	■	■
Prestop	Clonostachys rosea J1446	■	■
EPSOM	Fish oil	■	■
Vintec	Trichoderma atroviride SC1	■	■
Eradicoat	Maltodextrin	■	■

→ Missing data, no studies on the effects on beneficials available

Challenges

- A) No studies on the effects of the test product are submitted with reference to:
 - the “natural occurrence of the substance in nature”
(but: ... the dose makes the poison)
 - the selectivity of the substance

- B) Only studies on the effect of the active substance or other PPP with the same active substance are submitted

but: ppp's are evaluated and not their active ingredients (disregarding formulation effect)

- C) Test guidelines are very specific regarding the application method (spraying, seed treatment, water soluble substances)

- D) For some species no guidelines for higher tier testing are available

- E) Often no degradation rates of the product are available (e.g. products with microorganism) for the calculation of exposition

Summary

- the assessment/labelling of the effects of ppp's on beneficial arthropods is regulated
- there are standardized methods
- existing methods are mainly available for spray applications, methods for further application techniques would be desirable
- studies are submitted as part of the authorization process, which are evaluated and from which effects are derived
- effects are published as a group-specific summary on the data sheet and in the register of ppp's
- in future, simplified access to the information is to be guaranteed by making the data available online - species-specifically, different application rates
- labelling can be used to select ppp's with lower effects on beneficial arthropods



Assessment of the effects of pesticides (ppp) on non-target arthropods (other than bees) and its transfer into practice

Marlen Heinz & Peggy Marx

Thank you for your attention.

