



“Belgian Pesticide Risk and Use Indicators Methodology”

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1 Introduction

Pesticides are commonly used in agriculture to provide high crop yields and high quality of food products. Although the way they operate and the way they are applied improve continuously, they still can give rise to a range of (eco) toxicological side effects. A wise use of pesticides can contribute to a more sustainable agricultural production. In order to be able to measure progress towards sustainability in crop protection, indicators are indispensable.

Side effects of the use of plant protection products include toxicity risk to the person applying the product, the presence of residues above the threshold level in food, development of resistant pathogens and damage to natural resources (accumulation of active ingredients in groundwater).

Awareness of these side effects has led the authorities to promote, in the context of sustainable agriculture, more environmentally friendly use of plant protection products and the development of alternative protection methods. Some recommendations (such as sprayer control and best practice guidelines) have been successfully implemented in the agricultural sector.

In order to assess the improvements being made, a specific tool complying with the Belgian situation is needed to measure the significance of the improvements and how they are contributing to the sustainable use of plant protection products in agriculture. The tool developed specifically for Belgium is the Pribel (Pesticide Risk Indicator for BELgium).

The goal of the present federal reduction programme (KB 22/02/2005) is to achieve a risk reduction of 25% for pesticides in agriculture and 50% for biocides and non-agricultural pesticides in 2010 (compared to the reference year 2001). Within the framework of this project the Pribel was developed. By means of that Pribel-indicator these quantitative goals can be measured.

It could be expected that, in general, no pesticide registered for agricultural use would present an unacceptable risk for human health and the environment under normal application conditions. The registration of pesticides is meant to prevent this. Moreover it is not the aim of Pribel to reject active substances that manifest high risk indices. The main purpose of the development of a risk indicator for Belgium is to observe the evolution of the global risk caused by pesticides in agriculture for Belgium over the years.

2 Principle of PRIBEL

The Pribel (Pesticide Risk Indicator for Belgium) is based on the Pocer II-indicator (SPSDII, 2004). The Pocer II-indicator is an extension of the Pocer I-indicator, created at Ghent University (Vercruyssen & Steurbaut, 2002). The indicator is based on the acceptance criteria formulated in Annex VI of the European Council Directive 91/414/EC.

The PRIBEL will assess, at the level of all Belgium, both the human risk from occupational exposure to pesticides and the risk to the environment from the use of agricultural pesticides. The indicator consists of seven modules covering both human health and environmental aspects.

For each module, the risk is estimated by the use of risk indices. A risk index (RI) is the quotient of the estimated human exposure or the Predicted Environmental Concentration (PEC) and a (eco)toxicological Predicted No Effect Concentration (PNEC). This risk evaluation can be represented in diagram form (Fig. 1).

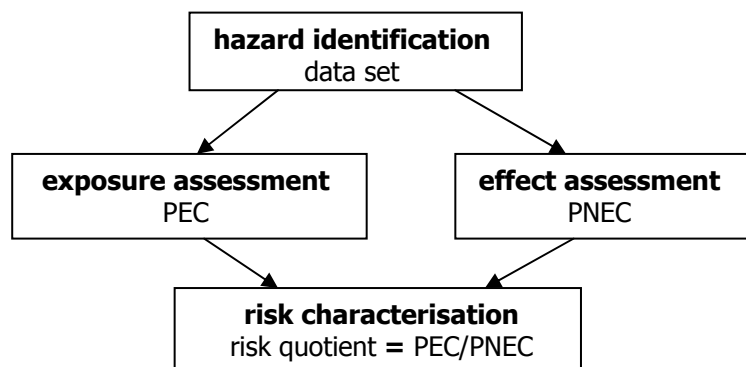


Figure 1: Risk evaluation of pesticides: principle of PRIBEL

3 Data Sources

- Kg of active substance yearly applied in Belgium: Studies Van Lierde
- Sales of active substances per year in Belgium: FOD VVVL, pers. comm.
- Ecological and toxicological values: these data are collected in the database of UGent, and obtained from the following sources (in order of importance):
 1. European Union
 2. CTB – The Netherlands (<http://www.ctb-wageningen.nl/>)
 3. Pandora's Box (Linders *et al.*, 1994)
 4. The Pesticide Manual (Tomlin, 2004)
 5. Extoxnet (<http://extoxnet.orst.edu/>)
 6. Toxnet (<http://toxnet.nlm.nih.gov/>)
 7. Other sources

It should be noticed that in the database used for the Pribel calculations, not any confidential value is still included. For 101 active substances the ecotoxicological data were provided by the producing company, but as one of the primary goals of Pribel was to be completely transparent, the confidential firm data were replaced by public data coming from the sources mentioned above. It has to be mentioned that sometimes big differences were noticed between the original firm data and the new public data. Annex IV contains the database with the (eco)toxicological values for all the active substances used in Pribel. The values marked in yellow are default values.

4 Assumptions / limitations

4.1 Seven compartments

In function of available data and risk indicators adapted to a wide scale risk assessment, seven out of the fourteen compartments of Pocer-II were selected for use in Pribel:

Table 1: Compartments used in Pocer-II and Pribel

Compartment	Pocer-II	Pribel
consumers	+	+
applicators	+	+
farm-workers	+	
bystanders	+	
birds	+	+
bees	+	+
beneficials	+	
water organisms	+	+
earthworms	+	+
air	+	
soil	+	
ground water	+	+
resistance induction	+	
farm cost	+	

At the moment, they are stated as equivalent in importance in order to be as "neutral" as feasible. Later on, a ranking in importance can be given based on expert judgment.

▪ Pesticide operator

Pesticide operators are persons who mix, load and apply the pesticides.

The risk index for pesticide operators ($RI_{\text{applicator}}$) is calculated as the quotient of the internal exposure ($IE_{\text{applicator}}$) and the Acceptable Operator Exposure Level (AOEL), both expressed in mg/kg body weight/workday). The internal exposure ($IE_{\text{applicator}}$) is calculated using the EUROPOEM model (EUROPOEM, 1996).

$$RI_{\text{applicator}} = IE_{\text{applicator}} / AOEL$$

▪ Consumer

The consumer runs the risk of being exposed to pesticides because of the residues of those substances that are present in the consumed food. The risk index for the consumer is calculated by the following formula (SPSD II, 2004):

$$RI_{\text{consumer}} = (MRL * EDI * AR) / (ADI * RD)$$

MRL = Maximum Residue Limit (mg as/ kg food)

EDI = Estimated Daily Intake (kg food/kg BW/day)

AR	= Application Ratio (kg as/ha)
ADI	= Acceptable Daily Intake (mg as/kg BW/day)
RD	= Reference Dose (kg as/ha)

▪ **Water organisms**

The PEC_{waterorg} is calculated as follows (Pussemier, 1999 (adapted by Van Bol *et al.*, 2004))

APESUW	= Amount Potentially Exportable to Surface Water = direct loss + drift + runoff + (interflow + drainage)
SPR	= Standard Percentage Runoff Water (default: 33%)
rainfall	= Average yearly rainfall (default: 780 mm)
PCOW	= Predicted Concentration in Outflowing Water = (APESUW/rainfall * SPR) (g/L)
BFI	= Base Flow Index = fraction of river water not directly linked to rainfall = 0.50
PEC_{waterorg}	= PCOW * (1-BFI)

Table 2: Emission factors considered for transport to surface waters

Entry route	Emission factor (%)
Direct loss	0.5 ^a
Drift	Field: 0.004 ^a (assuming water/land ratio = 1%) Fruit: 0.051 ^a (assuming water/land ratio = 1%) Seed treatment/granules: 0
Runoff	0.4 ^b
Interflow and drainage	0.01 ^b if GUS < 3 0.1 ^b if 3 < GUS < 4 1 ^b if 4 < GUS < 4.5 10 ^b if GUS > 4.5

^a Percent of pesticide applied = AR

^b Percent of pesticide reaching the soil

Pesticide reaching the soil = (AR-Direct losses-Drift losses) * (1 – crop interception factor) (Table 5)

The endpoint for water organisms is based on the toxicity for three groups of organisms (fish, daphnia and algae). Directive 2000/60/EC of the European Parliament describes the procedure for the setting of chemical standards for the protection of aquatic biota.

Table 3: Safety factors for the calculation of the endpoint for water organisms

Description of the endpoints	Safety factor
At least one acute L(E)C ₅₀ from each of the three trophic levels of the base set	1000
One chronic NOEC (either fish or daphnia or representative organism for saline waters)	100
Two chronic NOECs from species representing two trophic levels (fish and/or daphnia or a representative organism for saline waters and/or algae)	50
Chronic NOECs from at least three species (normally fish, daphnia or a representative organism for saline waters and algae) representing three trophic levels	10
Other cases, including field data or model ecosystems, which allow more precise safety factors to be calculated and applied	case-by-case assessment

The safety factors can be based either on chronic or acute risks (Table 3). On the basis of these safety factors a Maximum Tolerable Concentration (MTC) is calculated for water organisms, for each active substance.

The risk index for aquatic organisms is calculated as the quotient of the PEC_{waterorg} and the MTC-value.

$$RI_{\text{waterorg}} = PEC_{\text{waterorg}} / MTC$$

▪ Leaching to groundwater

The $PEC_{\text{groundwater}}$ is calculated as follows (Pussemier, 1999 (adapted by Beernaerts *et al.*, 2003))

GUS	= Ground Ubiquity Score = $\log(DT_{50}) * (4 - \log(K_{OC}))$
CSPER1	= $0.0004 * GUS \exp(8.228)$ (g/ha.year)
APEBOD	= Amount Potentially Exportable Below One meter Depth = $CSPER1 * (AR/RD) * \text{soil correction}$ (g/ha.year)
$PEC_{\text{groundwater}}$	= $(APEBOD * 1000/RG)$ (g/L)
DT_{50}	= half-life of pesticides in soil (days)
K_{OC}	= soil organic carbon/water partition coefficient (ml/g)
AR	= application rate (g/ha)
RD	= reference dose (g/ha; default: 1000)
RG	= recharge groundwater (m ³ /ha.year; default: 2600)

Table 4: Correction factors for the determination of APEBOD according to the pedo-climatic conditions of the regio of concern

Type of soil	Rainfall < 750 mm	750 mm < Rainfall < 850 mm	Rainfall > 850 mm
Sandy	0.67	0.95	1.00
Loam	0.10	0.14	0.38
Humous	0.33	0.43	0.48

Remark: Average rainfall in Belgium: 780 mm (<http://www.kmi.be>)
Worst case scenario: leaching to the groundwater is most important in a sandy soil
⇒ Correction factor = 0.95

The risk index of groundwater is calculated with formula:

$$RI_{\text{groundwater}} = PEC_{\text{groundwater}} / 0.1$$

$PEC_{\text{groundwater}}$ = Predicted Environmental Concentration in groundwater ($\mu\text{g/L}$)
0.1 = drinking water quality standard ($\mu\text{g/L}$)

▪ Earthworms

During pesticide applications, part of the application reaches the ground, and may pose a risk to soil organisms like earthworms.

For the estimation of the initial PEC, the pesticide is assumed to accumulate homogeneously in the top 5 cm of the soil. When pesticides are sprayed over the crops, only a fraction reaches the soil beneath the plants (Table 5). For an application with treated seeds it is assumed that the total pesticide dose reaches the soil.

Table 5: Crop interception factors for early and late crop stages (Beernaerts & Pussemier, 1997)

Crop	Crop interception factor (fraction)	
	Early	Late
Potatoes, beets	0.22	0.88
Fruit orchard	0.44	0.77
Vegetables	0.11	0.77
Corn	0.11	0.88
Maize	0.25	0.5
Greenhouse crops	0.5	0.5

Remark: In the worst case scenario the early growth stadium is considered because the hazard for earthworms is highest in this stadium.
⇒ Field = 0.22
⇒ Fruit orchard = 0.44

The initial PEC is calculated with the following formula:

$$PEC_{\text{initial}} = (100 * AR * f) / (d * \rho)$$

AR = application rate (kg/ha)

f = fraction reaching the soil (=1-crop interception factor)
 D = depth of soil layer (m; default: 0.05)
 ρ = soil density (kg/m³; default: 1400)

The risk index for earthworms is calculated using formula:

$$RI_{\text{earthworms}} = (PEC_{\text{initial}} * 10) / LC_{50}$$

PEC_{initial} = initial pesticide concentration in soil (mg/kg soil)
 LC₅₀ = acute LC₅₀ for earthworms (mg/kg soil)

▪ Birds

Birds can be exposed to pesticides when gathering feed on a treated field. Three different worst-case scenarios for bird exposure are assumed depending on the pesticide formulation.

1) Eating sprayed crops (Liquid)

PEC_{bird} = 31 * AR * BW * 0.3
 = estimated total daily pesticide intake (mg/day)
 AR = application rate (kg/ha)
 BW = body weight (kg; default: 0.01)

2) Eating treated seeds (Seed Treatment)

PEC_{bird} = AR * BW * 0.3
 = estimated total daily pesticide intake (mg/day)
 AR = application rate (mg/kg treated seed)
 BW = body weight (kg; default: 0.01)

3) Eating granules

PEC_{bird} eating granule = 20 GW * A
 20: a daily consumption of 20 granules
 W: Granule Weight (mg; default = 2)
 A: fraction of a.s. in the granule

The risk index for birds is calculated with formula:

$$RI_{\text{birds}} = (PEC_{\text{bird}} * 10) / (LD_{50} * BW)$$

LD₅₀ = acute LD₅₀ for birds (mg/kg BW)

▪ Bees

The risk index for bees is calculated as follows:

$$RI_{\text{bees}} = AR / (LD_{50} * 50)$$

AR = application rate (g/ha)
 LD₅₀ = minimum (LD_{50,oral}; LD_{50,contact}) (µg/bee)

4.2 Five pesticide groups

Five pesticide groups can be distinguished: insecticides, fungicides, herbicides, soil disinfectants and non plant protection products. The last category has been made up but the results were not satisfying due to a lack of correct and complete data. Therefore the authors of this report ask the risk managers of the federal authorities to drop the results of the non plant protection products until more ecotoxicological information about these substances is available. In Table 6 the composition of the different pesticide groups is listed.

Table 6: Composition of the different pesticide groups

Pesticide group	Composition
Insecticides	Acaricides, insecticides, rodenticides, molluscicides, moleicides
Fungicides	Fungicides, bactericides
Herbicides	Herbicides, defoliantes, antimosses, growth regulators, germ inhibitors
Soil disinfectants	Soil disinfectants, nematicides, disinfectants
Non plant protection products	Additives, repellents, bandages, emulsions, curing agents

4.3 Nine crop groups

A distinction has been made between nine crop groups, according to the available data and the importance of the culture for the Belgian situation. The exact composition of the different groups is mentioned in the table below (Table 7).

Table 7: Composition of the different crop groups

Crop group	Composition
Potato	Potato
Orchard	Apple, pear, nursery
Cereal	Barley, wheat
Sugarbeet	Sugarbeet
Maize	Maize, corn
Fodder	Temporary grassland, permanent grassland
Vegetables	Chicory, leek, bean, spinach, carrot, cabbage, pea
Industrial	Flax, colza
Greenhouse	Tomato, lettuce

4.4 Formulation type

The formulation of the applied pesticides is an important factor in risk assessment. Diverse formulations can have different risks to certain compartments of Pribel. Most of the pesticides are used in liquid formulation, but there are a few exceptions which are listed in Table 8. The

percentages in the coloured lines are expert estimations (W. Steurbaut, test centres Beitem and Destelbergen). E.g. dichlobenil in apple is only allowed to be used under a granule formulation (Fytoweb) which results in 100%, whereas oxamyl in greenhouse vegetables can be used as granule and as liquid as well. To estimate the percentage of granule formulation of oxamyl expert judgment was needed. People of the test centre of Beitem submitted a value of 10% for granules, which means that 90% of the oxamyl used in greenhouse vegetables is applied under a liquid formulation.

Table 8: Survey of the active substances formulated as granules

culture	category	number	product name	active substance	% GR	% a.s. in granulate
apple	herb	5312/B	Casoron GR	dichlobenil	100	6,75
chicory	inse	6658/B	Curater	carbofuran	100	5
	inse	7536/B	Curater 1 GR	carbofuran	100	1
	inse	8153/B	Furadan 5 G	carbofuran	100	5
	inse	9217/B	Belfort 1 GR	carbofsulfan	100	1
	inse	7274/B	Marshal 5 GR	carbofsulfan	100	5
	inse	7723/B	Sheriff 1 GR	carbofsulfan	100	1
greenhouse vegetables	inse	6591/B	Vydate 10G	oxamyl	10	10
leek	inse	6658/B	Curater	carbofuran	100	5
	inse	7536/B	Curater 1 GR	carbofuran	100	1
	inse	8153/B	Furadan 5 G	carbofuran	100	5
	inse	8196/B	Dursban 5G	chloorpyrifos	100	5
	inse	8353/B	Pychlorex 5G	chloorpyrifos	100	5
	inse	9264/B	Volasect	chloorpyrifos	100	5
	inse	9217/B	Belfort 1 GR	carbofsulfan	100	1
	inse	7723/B	Sheriff 1 GR	carbofsulfan	100	1
maize	inse	6658/B	Curater	carbofuran	100	5
	inse	8153/B	Furadan 5 G	carbofuran	100	5
	inse	7557/B	SPI	carbosulfan	100	10
	inse	7274/B	Marshal 5 GR	carbosulfan	100	5
nursery	herb	8136/B	Casoron 4 GR	dichlobenil	100	4
	herb	5312/B	Casoron GR	dichlobenil	100	6,75
	herb	9058/B	Gorsatyl	dichlobenil	100	4
	herb	7999/B	Kerb Super GR	diuron	100	1,33
				propryzamide	35	1,67
				simazin	35	0,83
	herb	7973/B	Ronstar GR	carbeetamide	100	1,5
			oxadiazon	100	2	
pear	herb	5312/B	Casoron GR	dichlobenil	100	6,75
potato	inse	8426/B	Mocap 20 MG	ethopfos	100	20
	inse	6591/B	Vydate 10G	oxamyl	100	10
sugarbeet	inse	6658/B	Curater	carbofuran	100	5
	inse	8153/B	Furadan 5 G	carbofuran	100	5
	inse	8941/B	Regent Plus	aldicarb	100	8,6
				fipronil	100	1,4

Some active substances are used exclusively for seed treatment in certain cultures. In Table 9 the percentage of this application in the specific cultures is mentioned. The percentages in the coloured lines are expert estimations (W. Steurbaut, test centres Kruishoutem, Destelbergen and Beitem, KBIVB Tienen). For instance the fungicide bitertanol is allowed to use as seed treatment in wheat, triticale and spelt. As other formulation types are not allowed in that cultures (Fytoweb), the percentage of bitertanol that is used as seed treatment in wheat, triticale and spelt is 100%. Carbofuran in sugarbeet on the other hand can be used both as seed treatment and as a granule. Hence, the percentage of carbofuran which is used as seed treatment had to be estimated by experts. The people of the KBIVB Tienen stated that these days carbofuran is only used as a granule in the field, and no longer as a seed treatment. This resulted in 0% in the last column of Table 9.

Table 9: Survey of active substances which might be used as seed treatments

active substance	formulation type	category	culture	% ST
anthrachinon	ST	nppp	wheat, barley, rye, triticale, spelt, oat, cereal	100
bitertanol	ST	fung	wheat, triticale, spelt	100
carbofuran	ST/GR	inse	sugarbeet	0
fipronil	ST	inse	onion, leek, wheat, spelt, maize, sugarbeet	100
fludioxonil	ST	fung	wheat, barley, rye, triticale, spelt, oat, maize	100
fuberidazool	ST	fung	wheat	100
guazatine	ST	fung	wheat, spelt	100
guazatine triacetaat	ST	fung	wheat, rye, oat, barley, triticale	100
hymexazool	ST	fung	sugarbeet	100
imazalil	ST	fung	wheat, rye, oat, barley	100
imidacloprid	ST	inse	lettuce, endive, sugarbeet, barley, maize	100
iprodion	ST	fung	sugarbeet	100
iprodion	ST/WG/L	fung	cabbage	5
mancozeb	L/ST/WP	fung	ornamental plants, wheat, vegetables	5
mancozeb	ST	fung	peas	100
metalaxyl-m	ST	fung	maize	100
prochloraz	ST	fung	flax	100
tebuconazool	ST/L	fung	barley	5
tefluthrin	ST	inse	wheat, barley, rye, triticale, spelt, oat, sugarbeet	100
thiram	ST	fung	maize, sugarbeet, peas	100
triazoxide	ST	fung	barley	100
triconazool	ST	fung	wheat, rye, triticale, spelt	100

With ST = seed treatment; GR = granule; WG = wettable granule; WP = wettable powder and L = liquid.

4.5 Yearly applied doses in Belgium

The doses which are applied per year in Belgium are taken from the studies of Van Lierde. By means of inquiries estimations of the used amounts of pesticides per crop were obtained. These doses are listed in Annex I.

4.6 Application rate

The application doses are taken from the inquiries from Van Lierde et al., so these are not the official maximum allowed rates from Fytoweb, but the real use doses in Belgium. Only in the case of multi-applications the national doses from Van Lierde are compared with the official doses from Fytoweb (<http://www.fytoweb.fgov.be>). The term multi-applications means that an active substance is used more than once a year on the same crops, e.g. mancozeb on potatoes can be applied up to 12 times a year. The doses for one application (in the case of multi-applications) are listed in the fourth column of Annex I.

4.7 Frequency

The risk index RI is calculated using the appropriate algorithm for each risk event: one hazard for one compartment at one moment on one parcel. The risk index is calculated for every pesticide-crop combination existing in Belgium. There are about 8 000 of these pesticide-crop combinations possible in Belgium. For one specific pesticide-crop combination, the risk index occurs at a given frequency.

Because of differences between the public use data from Van Lierde and the sales data from the Belgian Government, a repartition coefficient was developed (Pissard, 2005). This repartition coefficient gives the repartition of the used amounts of each active substance in the non-agricultural and agricultural sectors. These results in a repartition coefficient for each active substance corresponding with the different crops considered. The repartition coefficient is a relative percentage of the total uses (Van Lierde) or total sales (Belgian Government) of that particular active substance.

$$\text{Repartition coefficient (for the agricultural sector)} = \frac{\text{used amount of a.s. in crop x [kg]}}{\text{total used or total saled amount of a.s. [kg]}}$$

Used amount of a.s. in crop x by Van Lierde;
 Total used amount of a.s. by Van Lierde;
 Total saled amount of a.s. by the Belgian Government.

With the repartition coefficient and the sales, the used amount per crop is calculated. The frequency is obtained by dividing this last amount with the application rate. The frequency can be considered as the number of risk events that happen in one year in Belgium.

$$\text{Used amount per crop in Belgium}_{i,j} [\text{kg/yr}] = \text{sales}_i [\text{kg/yr}] * \text{repartition coefficient}_{i,j} (\%)$$

Where *i* represents an active substance and *j* represents a crop;
 Sales = national sales for Belgium, by the Belgian Government, pers. comm.

$$\text{Frequency}_{i,j} [1/\text{yr}] = \frac{\text{used amount per crop in Belgium}_{i,j} [\text{kg/yr}]}{\text{AR}_{i,j} [\text{kg/ha}]}$$

AR = Application rate (Van Lierde)

5 Aggregation

The goal of an indicator being to synthesize as much information as possible into a few figure(s) or graphical representations, an aggregation procedure involving several steps is proposed. In this way, we will be able to concentrate all the information in a global PRIBEL value for Belgium but intermediate results will still be available for more refined comparisons, e.g. assessment of the impact of all pesticides on a single compartment.

5.1 Spatial aggregation

The first stage of aggregation is to move from the reference dose to the whole amount of pesticide used in Belgium (spatial aggregation). This will be done using the following relation:

$$\text{PRIBEL}_{\text{a.s., crop, comp, year}} = \text{RI}_{\text{a.s., crop, comp, year}} * \text{Frequency of use}_{\text{a.s., crop, year}}$$

- PRIBEL and RI refer to a given a.s., a given crop group, an environmental compartment and a specific year.
- Frequency of use is the number of risk events in Belgium per crop, per year and per a.s.

5.2 Aggregation of the active substances

The second step of aggregation will be made by considering all active substances or a group of active substances (insecticides, fungicides, herbicides, soil desinfectants or non plant protection products):

$$\text{PRIBEL}_{\text{comp, year}} = \sum \text{PRIBEL}_{\text{a.s., comp, year}}$$

Three possible scenarios can be followed to aggregate the risk indices for a specific compartment. Level 1 aggregates all the active substances over all the crops. Level 2 makes a division into one of the five groups of active substances and aggregates them over all the crops, whereas level 3 aggregates all the active substances over the nine different crop groups. These 3 aggregations are always for the surface Belgium end for 1 year. Table 10 summarizes this explanation.

Table 10: Overview of the three types of aggregation per compartment

Scenario nr	compartment	active substance	surface	time	crop
1	e.g. water organisms	all as	Belgium	1 year	all crops
2	e.g. water organisms	groups	Belgium	1 year	all crops
3	e.g. water organisms	all as	Belgium	1 year	crop groups

Thus, at this stage, for a given year, one figure will be obtained for level 1, five figures for level 2 and nine figures for level 3.

5.3 Aggregation of the seven compartments

Depending on the way the final results are used, a global risk indicator can be calculated for a given year:

$$PRIBEL_{year} = \text{aggregative function of the 7 } PRIBEL_{comp, year}$$

This aggregative function can be an arithmetic sum of the indices, or it can be obtained by expert judgment by assigning a weight factor to the different compartments. The choice of the aggregative function will be made after completion of the preliminary study that has been submitted by the authors.

6 Uncertainty and variability

The results of Pribel include some uncertainty and variability due to both the used formulas and the chosen approach, and to the input data. The explanation in the sections below has the aim to avoid misinterpreting of the Pribel results by ignoring the uncertainty and variability involved in the Pribel calculations.

6.1 Formulas and approach

The results of the Pribel-indicator have to be handled with care and to be well explained to the people. The final values are the results of a first tier approach, which means that is a rough approach based on a worst case scenario, which gives a global trend but never provides realistic values.

6.2 Input data

The uncertainty and variability of the input data can be divided into four different cases: uncertainty about the application dose, about the ecotoxicological values of the active substance itself, about the sales and use data and about the formulation types.

6.2.1 Application dose

With regard to the application dose, greenhouse crops and industrial crops are considered as consisting a high uncertainty. The difficulty with greenhouse crops is finding the exact applied dose. The information coming from Van Lierde is limited for greenhouse crops, and doses on Fytoweb are very vague (pouring, dripping, dipping) and hard to convert into kg/ha.

For the industrial crops (flax and colza) there is a lack of data about which active substances are used in that culture and in which dose they are applied (missing or unreliable values in the study of Van Lierde).

6.2.2 Ecotoxicological data

Concerning the non plant protection products (nppp), a lot of data are missing. There is too little known about the physico-chemical and ecotoxicological values from the active substances belonging to the nppp (additives, repellents, bandages, emulsions, curing agents) which results in incompleting Pribel calculations.

The lack of data in the previous two cases is corrected by using default values, which results in Pribel values for all the cases, but one has to keep in mind that the input data behind the results are often default values for greenhouse crops, industrial crops and non plant protection products.

6.2.3 Sales and use data

The official but confidential sales data (FOD VVVL, pers. comm.) are not the same as the use data (Van Lierde). Use data are not for 100% correct, due to the fact that they are established by means of inquiries, but neither are sales data, for the reason that the amount of stocks and export is difficult to estimate.

6.2.4 Formulation types

Most of the pesticides are applied in liquid formulation, but there are some exceptions which are listed in Table 8. The coloured lines in Table 8 contain estimated values obtained by expert judgment which means that there is an uncertainty factor on these values. The same goes for the seed treatments, mentioned in Table 9.

7. Relevance of the different compartments

With Pribel the values for all compartments are calculated, but not all compartments are relevant. In Table 11 the importance of the different indices to the compartments is shown, as determined in the Standard Operation Procedure for the Pribel-indicator. This is the basic table for relevancy concerning different crop types and application types, but still questions could arise whether the compartment consumer is relevant for pesticides applied in maize, whether pesticides used in sugarbeet can cause a risk to the bees, whether birds are even exposed to pesticides used in greenhouse crops, etc. These questions should be solved by expert judgment of the steering committee or by the members of the 14 thematic groups.

Table 11: Importance of the indices in different exposure situations

Compartments Exposure routes Application characteristics	applicator all	groundwater all	water organisms		birds			earthworms all	bees all
			drift	direct losses	plant	seed	granule		
Crop type									
Field crop	1	1	1	1	1	1	1	1	1
Orchard	1	1	1	1	1	1	1	1	1
Greenhouse	1	1	0	1	0	0	0	0	0 ^a
Application type									
Seed dressing	1	1	0	0	0	1	0	1	0 ^b
Spraying	1	1	1	1	1	0	0	1	1
Pouring	1	1	1	1	0	0	0	1	0
Granule	1	1	0	0	0 ^c	0	1	1	0
Soil injection	1	1	0	1	0	0	0	1	0

0: negligible impact 1: possible impact

^a Considering no honey bees in greenhouses

^b Assuming no indirect effects linked to seed dressing

^c Assuming negligible effect due to systemicity

8. General results

8.1 Endtables for 2000, 2001, 2002 and average 2001

Table 12: Pribel values (sum (RIxF)) for the seven compartments and the four time periods

	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
All	2000	1.52E+05	1.93E+08	6.13E+07	1.49E+07	3.00E+08	3.41E+05	1.28E+08
	2001	1.25E+05	1.79E+08	5.60E+07	1.50E+07	3.09E+08	2.87E+05	1.15E+08
	2002	1.24E+05	1.32E+08	6.36E+07	1.17E+07	2.43E+08	2.72E+05	8.16E+07
	Mean	1.34E+05	1.68E+08	6.03E+07	1.39E+07	2.84E+08	3.00E+05	1.08E+08

Table 13: Pribel values (sum (RIxF)) for the aggregation by pesticide groups, for the seven compartments and the four time periods

Pesticide group	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
INSE	2000	1.18E+04	6.66E+07	5.83E+07	1.22E+07	1.74E+08	4.58E+04	1.08E+07
	2001	1.24E+04	6.88E+07	5.34E+07	1.31E+07	2.01E+08	4.17E+04	1.19E+07
	2002	1.06E+04	7.41E+06	6.09E+07	9.96E+06	1.44E+08	3.91E+04	9.18E+06
	Mean	1.16E+04	4.76E+07	5.75E+07	1.18E+07	1.73E+08	4.22E+04	1.06E+07
HERB	2000	4.46E+04	3.16E+07	3.07E+05	4.34E+05	5.94E+07	9.03E+04	7.11E+07
	2001	3.99E+04	3.04E+07	2.84E+05	4.39E+05	5.11E+07	8.92E+04	7.00E+07
	2002	4.11E+04	2.80E+07	2.86E+05	3.75E+05	4.07E+07	7.61E+04	3.65E+07
	Mean	4.19E+04	3.00E+07	2.93E+05	4.16E+05	5.04E+07	8.52E+04	5.92E+07
FUNG	2000	9.54E+04	8.25E+07	5.56E+05	2.29E+06	6.61E+07	2.05E+05	4.36E+07
	2001	7.25E+04	7.15E+07	4.47E+05	1.40E+06	5.61E+07	1.54E+05	3.04E+07
	2002	7.25E+04	8.82E+07	5.07E+05	1.35E+06	5.77E+07	1.55E+05	3.28E+07
	Mean	8.02E+04	8.07E+07	5.03E+05	1.68E+06	6.00E+07	1.71E+05	3.56E+07
SODE	2000	1.09E+01	1.21E+07	2.14E+06	0.00E+00	8.53E+05	1.71E+02	2.94E+06
	2001	8.96E+00	6.52E+06	1.92E+06	0.00E+00	7.57E+05	1.58E+02	2.73E+06
	2002	9.02E+00	6.61E+06	1.93E+06	0.00E+00	7.02E+05	1.56E+02	3.05E+06
	Mean	9.62E+00	8.41E+06	2.00E+06	0.00E+00	7.70E+05	1.61E+02	2.91E+06
NPPP	2000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2001	1.03E+02	1.72E+06	2.75E+03	2.07E+04	1.25E+04	1.50E+03	3.60E+04
	2002	9.25E+01	1.69E+06	2.63E+03	2.08E+04	1.22E+04	1.36E+03	3.24E+04
	Mean	6.52E+01	1.14E+06	1.79E+03	1.38E+04	8.24E+03	9.53E+02	2.28E+04

Table 14: Pribel values (sum (RIxF)) for the agregation by crop groups, for the seven compartments and the four time periods

Crop group	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
Potato	2000	1.59E+04	8.23E+07	5.45E+05	2.59E+06	7.48E+07	9.48E+04	1.48E+07
	2001	1.45E+04	7.45E+07	2.44E+06	2.84E+06	5.88E+07	7.81E+04	1.25E+07
	2002	1.44E+04	8.85E+07	2.42E+06	1.78E+06	5.74E+07	9.17E+04	1.08E+07
	Mean	1.49E+04	8.18E+07	1.80E+06	2.41E+06	6.37E+07	8.82E+04	1.27E+07
Maize	2000	9.76E+02	2.83E+07	6.52E+06	1.06E+06	1.60E+07	3.52E+04	1.26E+07
	2001	9.89E+02	2.90E+07	6.62E+06	1.11E+06	1.76E+07	3.52E+04	1.07E+07
	2002	6.90E+02	7.90E+06	6.79E+06	1.01E+05	5.73E+06	2.13E+04	1.39E+07
	Mean	8.85E+02	2.17E+07	6.64E+06	7.56E+05	1.31E+07	3.06E+04	1.24E+07
Vegetables	2000	1.14E+03	5.80E+06	9.72E+05	3.51E+05	2.57E+07	2.93E+04	1.55E+07
	2001	1.05E+03	5.45E+06	1.04E+06	3.90E+05	2.83E+07	2.47E+04	1.06E+07
	2002	1.02E+03	4.44E+06	9.91E+05	3.84E+05	1.89E+07	2.08E+04	1.04E+07
	Mean	1.07E+03	5.23E+06	1.00E+06	3.75E+05	2.43E+07	2.49E+04	1.22E+07
Ochard	2000	7.25E+04	1.19E+06	2.48E+06	5.39E+06	8.10E+07	3.46E+04	2.05E+07
	2001	5.29E+04	1.00E+06	3.09E+05	5.64E+06	8.30E+07	2.99E+04	1.71E+07
	2002	5.14E+04	9.00E+05	2.68E+05	5.00E+06	8.12E+07	2.55E+04	1.73E+07
	Mean	5.90E+04	1.03E+06	1.02E+06	5.34E+06	8.17E+07	3.00E+04	1.83E+07
Sugar	2000	5.65E-01	3.68E+07	5.05E+07	0.00E+00	4.57E+07	1.16E+05	4.64E+07
	2001	5.77E-01	3.70E+07	4.53E+07	0.00E+00	4.54E+07	9.57E+04	4.04E+07
	2002	5.62E-01	4.84E+06	5.29E+07	0.00E+00	2.28E+07	9.07E+04	1.58E+07
	Mean	5.68E-01	2.62E+07	4.96E+07	0.00E+00	3.80E+07	1.01E+05	3.42E+07
Cereal	2000	5.95E+04	2.00E+07	1.68E+05	4.39E+06	5.26E+07	2.69E+04	4.90E+06
	2001	5.43E+04	1.97E+07	1.53E+05	3.67E+06	5.43E+07	1.88E+04	9.88E+06
	2002	5.55E+04	1.55E+07	1.49E+05	3.61E+06	4.96E+07	1.81E+04	5.79E+06
	Mean	5.64E+04	1.84E+07	1.57E+05	3.89E+06	5.22E+07	2.13E+04	6.85E+06
Industrial	2000	0.00E+00	4.07E+05	1.70E+04	3.22E+05	6.46E+06	1.02E+03	8.26E+06
	2001	0.00E+00	3.64E+05	1.62E+04	4.01E+05	7.60E+06	8.86E+02	7.08E+06
	2002	0.00E+00	3.58E+05	1.80E+04	5.11E+05	8.26E+06	6.46E+02	1.86E+06
	Mean	0.00E+00	3.77E+05	1.71E+04	4.12E+05	7.44E+06	8.51E+02	5.73E+06
Greenhouse	2000	1.76E+03	1.22E+07	0.00E+00	0.00E+00	3.17E+03	0.00E+00	3.89E+06
	2001	1.26E+03	6.55E+06	0.00E+00	0.00E+00	2.56E+03	0.00E+00	5.50E+06
	2002	1.30E+03	6.63E+06	0.00E+00	0.00E+00	2.47E+03	0.00E+00	4.31E+06
	Mean	1.44E+03	8.45E+06	0.00E+00	0.00E+00	2.73E+03	0.00E+00	4.57E+06
Fodder	2000	0.00E+00	5.74E+06	6.19E+04	8.04E+05	4.62E+06	3.69E+03	1.63E+06
	2001	0.00E+00	5.45E+06	7.20E+04	9.65E+05	5.51E+06	3.38E+03	1.39E+06
	2002	0.00E+00	2.84E+06	2.83E+04	3.20E+05	1.18E+06	3.26E+03	1.44E+06
	Mean	0.00E+00	4.67E+06	5.41E+04	6.96E+05	3.77E+06	3.44E+03	1.49E+06

Table 15 and 16 give the results for 2000, 2001, 2002 and the mean in percentage of the year 2001 (%).

Table 15: Pribel values (sum (RIxF) in percentage of all 2001) for the seven compartments and for the four time periods

All	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
	2000	122	108	109	99	97	119	112
	2001	100	100	100	100	100	100	100
	2002	100	74	114	78	79	95	71
	Mean	107	94	108	92	92	105	94

Table 16: Pribel values (sum (RIxF) in percentage of all 2001) for the agregation by pesticide groups and crop groups for the seven compartments and for the four time periods

Pesticide group	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
INSE	2000	8	35	95	82	58	13	8
	2001	10	38	95	88	65	15	10
	2002	9	6	96	85	59	14	11
	Mean	9	26	95	85	61	14	10
HERB	2000	29	16	1	3	20	26	55
	2001	32	17	1	3	17	31	61
	2002	33	21	0	3	17	28	45
	Mean	31	18	0	3	18	29	54
FUNG	2000	63	43	1	15	22	60	34
	2001	58	40	1	9	18	54	26
	2002	58	67	1	12	24	57	40
	Mean	60	48	1	12	21	57	33
SODE	2000	0	6	3	0	0	0	2
	2001	0	4	3	0	0	0	2
	2002	0	5	3	0	0	0	4
	Mean	0	5	3	0	0	0	3
NPPP	2000	0	0	0	0	0	0	0
	2001	0	1	0	0	0	1	0
	2002	0	1	0	0	0	0	0
	Mean	0	1	0	0	0	0	0

Crop group	Year	Consumer	Applicator	Birds	Bees	Water Organisms	Earthworms	Groundwater
Potato	2000	10	43	1	17	25	28	12
	2001	12	42	4	19	19	27	11
	2002	12	67	4	15	24	34	13
	Mean	11	49	3	17	22	29	12
Maize	2000	1	15	11	7	5	10	10
	2001	1	16	12	7	6	12	9
	2002	1	6	11	1	2	8	17
	Mean	1	13	11	5	5	10	11
Vegetables	2000	1	3	2	2	9	9	12
	2001	1	3	2	3	9	9	9
	2002	1	3	2	3	8	8	13
	Mean	1	3	2	3	9	8	11
Ochard	2000	48	1	4	36	27	10	16
	2001	42	1	1	38	27	10	15
	2002	41	1	0	43	33	9	21
	Mean	44	1	2	38	29	10	17
Sugar	2000	0	19	82	0	15	34	36
	2001	0	21	81	0	15	33	35
	2002	0	4	83	0	9	33	19
	Mean	0	16	82	0	13	34	32
Cereal	2000	39	10	0	29	18	8	4
	2001	43	11	0	24	18	7	9
	2002	45	12	0	31	20	7	7
	Mean	42	11	0	28	18	7	6
Industrial	2000	0	0	0	2	2	0	6
	2001	0	0	0	3	2	0	6
	2002	0	0	0	4	3	0	2
	Mean	0	0	0	3	3	0	5
Greenhouse	2000	1	6	0	0	0	0	3
	2001	1	4	0	0	0	0	5
	2002	1	5	0	0	0	0	5
	Mean	1	5	0	0	0	0	4
Fodder	2000	0	3	0	5	2	1	1
	2001	0	3	0	6	2	1	1
	2002	0	2	0	3	0	1	2
	Mean	0	3	0	5	1	1	1

When *Sum (RIxF)* has a zero value in the tables 12, 13 and 14, it means that all the risk indexes are equal to “/” and/or “NR”, i.e. unknown and/or not relevant for the compartment.

The differences between the values of different years will not be explained in this report (see 3 examples below). It will be the object of further works as well as the analysis of uncertainty of each value. The analysis of the results for each crop group is the object of the contract “Follow-up of the Federal Pesticide Reduction Plan using Pribel”.

As an example, here are some explanations for the differences between years in the tables:

(1) The total risk on the applicator due to the treatments in maize (maize and corn) decreases strongly in 2002 in comparison with 2001. After analysis of the database, two facts explain this: 90 % of the decrease is explained by the end of use of lindane (and parathion in a much lower proportion) in 2002 and 10 % by a decrease (- 40%) in the frequency of use of atrazine in 2002.

(2) The disappearance of lindane in 2002 (and in a much lower proportion the disappearance of parathion) explains also the strong reduction of the total risk on the applicators in sugar (chicory and sugarbeet).

(3) The decrease in the total risk for the applicators in fodder (permanent and temporary grassland) in 2002 in comparison with 2001 is due at +/-80% to the end of use of lindane in permanent grassland and at +/-20% to the end of use of parathion in permanent grassland.

8.2 Remarks

Pribel database

In the Pribel database used for the Pribel calculations,

- 1) RI= “/” appears when some endpoints are missing for the calculation of RI.
- 2) RI= “NR” appears for the compartments Bees (when ImportanceForBee = 0), Earthworms (when ImportanceForEarthworms = 0), Consumers (when ImportanceForConsumers = 0) and Birds (when ImportanceForBirdEatingCrop and ImportanceForBirdsEatingSeed and ImportanceForBirdsEatingGranule = 0).

Calculations with R

The R program is a statistical program which is coupled with the Pribel database. It is used to aggregate the risk indexes over the years, the pesticide groups and the crops, and to calculate some statistical values, as there are the percentiles 25, 50, 75 and 95.

The application cases with a RI value equal to “/” or “NR” in the Pribel database are removed by the R program for the calculations.

Example: for Bees in 2001, 363 application cases are removed because for 50 RI values = “/” and for 313 RI values = “NR”.

Some RI values, especially for the compartment Groundwater, are equal to zero in the database. These cases of application are taken into account in the calculations with the R program but it would be better to ignore them because they can be assimilated to the application cases with a $RI=NR$. Their presence only influences (in a negligible way except for the compartment Groundwater) the sum of frequencies and not the Pribel values (sum $(RI \times F)$). The R script should be adapted in the future to take them out. At the moment, those particular RI values will be mentioned when they are present.

9 Example: risk on water organisms, 2001

9.1 Preliminary remarks on the studied applications of pesticides

At the beginning of the analysis, 59 application cases of active substances from the 977 cases (it concerns 22 molecules on 287) were excluded for not having a quantified value of the risk index (no toxicological endpoint for water organisms, MTC or Maximum Tolerable Concentration, in the Pribel database). Hence, these applications are not taken into account in the analysis. These 59 application cases represent 3.2 % of the total frequency of application. Most of the active substances are used as NPPP (non plant protection products). The main problem why it is so difficult to imply NPPP in impact analysis is because of the lack of toxicological values for water organisms (no acute and/or chronic endpoints).

Table 17: List of application cases withdrawn of the analysis

A.S. Name	Pesticide Group	Crop	Crop group
alkyl-aryl-polyglycoether	NPPP	maize	maize
benzoic acid	NPPP	greenhouse vegetables	greenhouse
didecyl dimethyl ammonium chloride	NPPP	greenhouse vegetables	greenhouse
estered coleseed oil	NPPP	maize	maize
estered coleseed oil	NPPP	potato storage	potato
estered coleseed oil	NPPP	sugarbeet	sugar
estered coleseed oil	NPPP	winter wheat	cereal
ethoxylated fatty amines	NPPP	apple	orchard
ethoxylated fatty amines	NPPP	winter wheat	cereal
fluoroglycofen ethyl	HERB	winter barley	cereal
fluoroglycofen ethyl	HERB	winter wheat	cereal
formic acid	NPPP	greenhouse vegetables	greenhouse
gamma aminobutyric acid	HERB	pear	orchard
gibberellic acid	HERB	apple	orchard
gibberellic acid	HERB	pear	orchard
gibberellic acids a4+18	HERB	apple	orchard
gibberellic acids a4+21	HERB	pear	orchard
glutaraldehyde	NPPP	greenhouse vegetables	greenhouse
glyoxylic acid	NPPP	greenhouse vegetables	greenhouse
iron sulfate	HERB	leek	vegetables
iron sulfate	HERB	pear	orchard
iron sulfate	HERB	winter wheat	cereal
isodecyl alcool ethoxylate	NPPP	chicory	sugar
isodecyl alcool ethoxylate	NPPP	corn	maize
isodecyl alcool ethoxylate	NPPP	greenhouse vegetables	greenhouse
isodecyl alcool ethoxylate	NPPP	maize	maize
isodecyl alcool ethoxylate	NPPP	pear	orchard
isodecyl alcool ethoxylate	NPPP	potato storage	potato
isodecyl alcool ethoxylate	NPPP	sugarbeet	sugar
isodecyl alcool ethoxylate	NPPP	winter wheat	cereal
metolachlor	HERB	bean without pod	vegetables
metolachlor	HERB	corn	maize
metolachlor	HERB	leek	vegetables
metolachlor	HERB	maize	maize
metolachlor	HERB	sugarbeet	sugar

mineral oil	INSE	apple	orchard
mineral oil	NPPP	corn	maize
mineral oil	NPPP	leek	vegetables
mineral oil	NPPP	maize	maize
mineral oil	NPPP	pear	orchard
mineral oil	INSE	potato storage	potato
mineral oil	INSE	sugarbeet	sugar
mineral oil	NPPP	winter wheat	cereal
naphthaleneacetamide	HERB	apple	orchard
neutral hydrocarbons	NPPP	maize	maize
nonyl phenol polyglycoether	NPPP	apple	orchard
nonyl phenol polyglycoether	NPPP	greenhouse vegetables	greenhouse
nonyl phenol polyglycoether	NPPP	leek	vegetables
nonyl phenol polyglycoether	NPPP	maize	maize
nonyl phenol polyglycoether	NPPP	pear	orchard
nonyl phenol polyglycoether	NPPP	potato storage	potato
nonyl phenol polyglycoether	NPPP	sugarbeet	sugar
nonyl phenol polyglycoether	NPPP	winter wheat	cereal
nonylphenol polyethylene glycol ether	NPPP	apple	orchard
nonylphenol polyethylene glycol ether	NPPP	corn	maize
nonylphenol polyethylene glycol ether	NPPP	pear	orchard
nonylphenol polyethylene glycol ether	NPPP	potato storage	potato
nonylphenol polyethylene glycol ether	NPPP	sugarbeet	sugar
nonylphenol polyethylene glycol ether	NPPP	winter wheat	cereal
oleic acid	NPPP	maize	maize
organic bases	NPPP	maize	maize

918 application cases concerning 265 active substances remain for analysis.

9.2 Preliminary remarks about the graphs

Four types of graphs illustrate the analysis. Some information useful to their comprehension is mentioned below.

Histograms

The risks events are grouped by intervals of one unity of \log_{10} of RI. Hence, from one interval to another, the risk increases 10 times. Example: the interval $\log_{10}=[0;1[$ corresponds to an interval from $RI=1$ to $RI=10$ (10 not included) and the interval $\log_{10}=[-1;0[$ from 0,1 to 1 (1 not included).

The first series of histograms (blue) show the proportion of the applications of the interval in the total frequency of the crop group and the other (red) their proportion in the total risk.

The null risks ($RI=0$) are included in the weakest interval (first interval at the left side) because they are converted into a weak value ($\log_{10} = -12$) to be able to integrate them in the construction of the graphs.

The purpose of such diagrams is twofold. First, they help to localize the application cases contributing the most to the total risk in the Pribel database. Second, they may help to

orientate the choice of pesticide reduction actions. Indeed, in an interval with a high proportion in the total risk (red) and a low proportion in the total frequency (blue), the reduction of the risk could be easier because it concerns a low number of applications. It would be more difficult to decrease the risk in an interval with a high proportion of the frequency.

It has to be noticed that the 59 application cases withdrawn of the analysis are not included in the histograms.

Bubble graphs

The surface of a bubble corresponds to the total risk (RIxF) of a crop group or pesticide group. This kind of graph shows which group causes the biggest part of the total risk in Belgium on the compartment (see also pie plots of total risks).

For each group, the middle of a bubble contains the following information. On the x-axis: the level of the risk of one application event in the particular group. The parameter which was retained to characterize this level is the RI median. It represents the value of RI for which half of the applications in the crop group has a weaker or a higher RI. This parameter characterizes better the studied distributions (i.e. irregular distributions) compared to the other calculated parameters (other percentiles or averages). On the y-axis: the total frequency of applications in the specific group (see also pie plots of frequencies).

Again the 59 application cases withdrawn of the analysis are not included in these values.

Pie Charts

Each pie portion represents the proportion of a pesticide group or crop group in the total risk for one compartment or in the total frequency of applications.

Also in this graph type, the 59 application cases withdrawn of the analysis are not included.

Boxplots

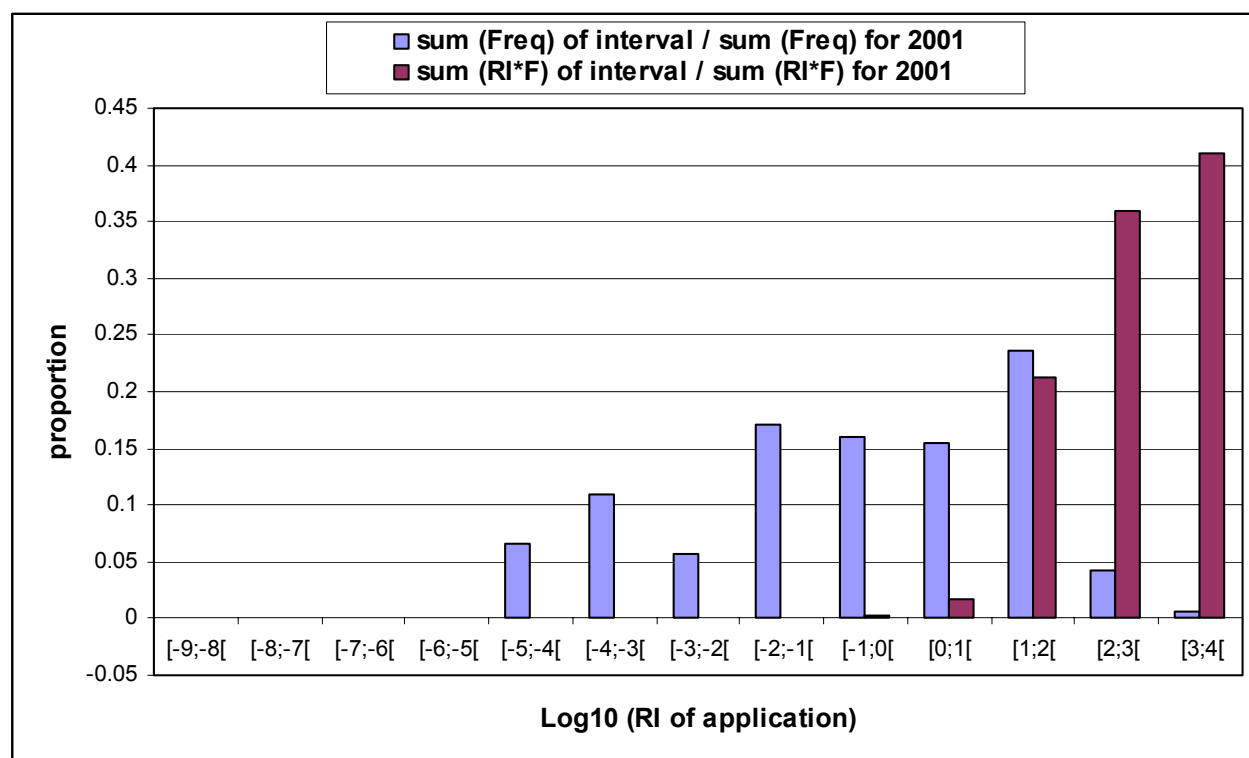
These graphs illustrate the characteristics of the frequency distribution in the various groups, namely their percentile 25, 50 and 75 as well as the maximum and the minimum.

9.3 Aggregation of total risk by year (2001 ± 1 year)

918 cases of application have a known risk index value RI. Their distribution of frequency and summed risk is shown in Table 18 and Histogram 1.

Table 18: Total risk and frequency of all the applications with a known RI for water organisms in 2001

Total risk RI*F	Frequency
2.84 E+08	8.65E+06



Histogram 1: Distribution of frequency and summed risk of all the pesticides used in 2001, for the compartment water organisms

98.8% of the risk on water organisms in 2001 is generated by 27% of the analysed risk events and 28.3% of the frequency. These are shown in the last 3 categories of histogram 1, namely the interval [1;4[. 77.0% of the total risk for water organisms is caused by only 4.7% of the total frequency and 12% of the application cases (interval [2;4[).

Application cases contributing the most strongly to the total risk RI*F and the risk RI

The active substances mentioned in Table 19 contribute for 55% to the total RI*F. 13 of the 19 active substances are insecticides, cypermethrin is even listed 5 times (in apple, potato, winter wheat, winter barley and sugarbeet). The exact RI-values are mentioned, whereas the values for the frequency and the total PRIBEL sum RI*F are mentioned in classes to guarantee the confidentiality about sales data. There are a few exceptions to the aforementioned rule, namely active substances that are already banned or for which there are at

least 3 registration holders (clause between FPS Health, Food Chain Safety and Environment and Phytofar). The sales of those active substances are officially published in this study.

The reason why a specific active substance is on top of the list with the highest risk indices RI is mostly a combination of a low MTC-value (Maximum Tolerable Concentration), this is the toxicological endpoint for water organisms used in the PRIBEL estimation, and a high application dose per hectare. The cause why an active substance heads the list with the highest total risks RI*F is a combination of a high risk index RI and a high frequency F. A high frequency is generated by high sales and/or a great number of applications per year. High sales often imply use in a crop cultivated on many hectares in Belgium (e.g. cereal, potato). The afore-mentioned fact explains why some particular active substances used in industrial crops, vegetables, fodder and greenhouse crops mentioned in Table 20 (high RI) are not included in Table 19 (high RI*F). The frequency of for instance endosulfan in leek and cypermethrin in permanent grassland is too small to result in a high total risk RI*F. And one of the reasons of the small frequency is the lesser number of hectares used to cultivate those crops in Belgium.

Table 19: Overview of the application cases that have the highest contribution to the total risk RI*F for water organisms in 2001

AS name	crop	crop group	pesticide group	frequency	RI water org	RI*F
mancozeb	potato	potato	FUNG	7.36 E+05	2.46E+01	1.81 E+07
cypermethrin	apple	orchard	INSE	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	pear	orchard	INSE	> 1E+03	4.19E+03	> 1E+07
cypermethrin	potato	potato	INSE	> 1E+03	3.98E+03	> 1E+07
lindane	sugarbeet	sugar	INSE	1.02 E+04	1.16E+03	1.19 E+07
cypermethrin	winterwheat	cereal	INSE	> 1E+03	1.98E+03	> 1E+07
dodine	apple	orchard	FUNG	> 1E+04	3.75E+02	> 1E+06
cypermethrin	winterbarley	cereal	INSE	> 1E+03	2.97E+03	> 1E+06
cypermethrin	sugarbeet	sugar	INSE	> 1E+03	3.98E+03	> 1E+06
flufenoxuron	apple	orchard	INSE	> 1E+03	3.29E+03	> 1E+06
bifenthrin	flax	industrial	INSE	> 1E+03	4.52E+03	> 1E+06
lindane	maize	maize	INSE	8.55 E+03	6.40E+02	5.47 E+06
chlorotoluron	winterbarley	cereal	HERB	> 1E+04	3.59E+02	> 1E+06
deltamethrin	carrot	vegetables	INSE	> 1E+03	2.13E+03	> 1E+06
aclonifen	potato	potato	HERB	> 1E+04	3.94E+02	> 1E+06
dodine	pear	orchard	FUNG	> 1E+04	3.90E+02	> 1E+06
endosulfan	apple	orchard	INSE	4.48 E+03	9.25E+02	4.14 E+06
fentin hydroxyde	potato	potato	FUNG	> 1E+05	2.00E+01	> 1E+06
diazinon	sugarbeet	sugar	INSE	> 1E+04	2.22E+02	> 1E+06

Table 20 shows the active substances that contribute for 55% to the total RI for water organisms. In this case the frequency is not considered, only the pure RI values (for one active substance and one application dose per hectare). All the active substances listed in the table below are insecticides. Cypermethrin is mentioned 6 times (in sugarbeet, potato, apple, winterbarley, winterwheat and permanent grassland). The reason of the different classification in Table 19 is the sales data and the number of application cases per year. Cypermethrin in permanent grassland is in the list with the highest RI values, but not in the list with the highest RI*F values. This is because of the relatively low sales data, which can be seen in the frequency value (> 1E+01) in comparison with the higher frequencies for the other crops (> 1E+03).

Bifenthrin in flax is number one in Table 20, whereas it only represents place 11 in Table 19. When only looking to the RI value of bifenthrin, it would be considered as most riskful for water organisms, but when taking the frequency into account and considering the total PRIBEL value RI*F, there are 10 application cases that are more riskful than bifenthrin is. The reason is, again, the low sales data of bifenthrin in flax.

Mancozeb heads Table 19, whereas it is completely absent in Table 20. The reason why mancozeb in potato has such a high RI*F value is the sold amount of mancozeb in 2001 for use in potatoes. The high sales are represented in the frequency (7.36 E+05).

Table 20: Overview of the application cases that have the highest contribution to risk RI for water organisms in 2001

AS name	crop	crop group	pesticide group	frequency	RI water org	RI*F
bifenthrin	flax	industrial	INSE	> 1E+03	4.52E+03	> 1E+06
flufenoxuron	pear	orchard	INSE	> 1E+03	4.19E+03	> 1E+07
cypermethrin	sugarbeet	sugar	INSE	> 1E+03	3.98E+03	> 1E+06
cypermethrin	potato	potato	INSE	> 1E+03	3.98E+03	> 1E+07
cypermethrin	apple	orchard	INSE	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	apple	orchard	INSE	> 1E+03	3.29E+03	> 1E+06
cypermethrin	winterbarley	cereal	INSE	> 1E+03	2.97E+03	> 1E+06
carbaryl	pear	orchard	INSE	> 1E+02	2.84E+03	> 1E+06
deltamethrin	carrot	vegetables	INSE	> 1E+03	2.13E+03	> 1E+06
parathion	leek	vegetables	INSE	1.44 E+03	2.00E+03	2.88 E+06
cypermethrin	winterwheat	cereal	INSE	> 1E+03	1.98E+03	> 1E+07
phosalone	pear	orchard	INSE	> 1E+03	1.98E+03	> 1E+06
phosalone	apple	orchard	INSE	> 1E+02	1.86E+03	> 1E+06
lindane	winterbarley	cereal	INSE	1.67 E+02	1.80E+03	3.25 E+05
	permanent					
cypermethrin	grassland	fodder	INSE	> 1E+01	1.70E+03	> 1E+05
endosulfan	leek	vegetables	INSE	5.78 E+02	1.50E+03	8.67 E+05
heptenophos	carrot	vegetables	INSE	> 1E+03	1.39E+03	> 1E+06
permethrin	leek	vegetables	INSE	> 1E+02	1.29E+03	> 1E+05

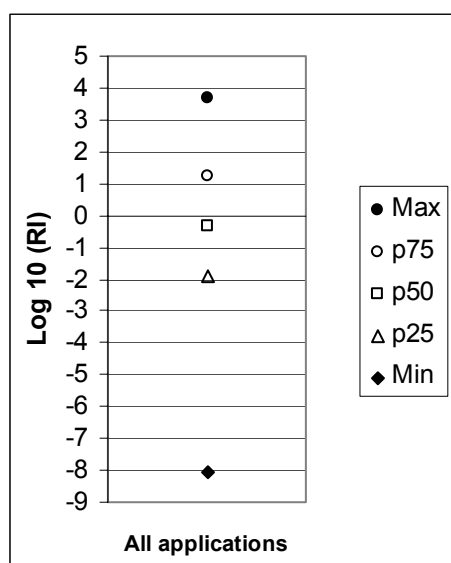
Percentiles of frequencies and their RI values

Table 21 shows the different percentiles for the whole database of active substances used in 2001, and the minimum and maximum values of risk. In boxplot 1 these characteristics are represented graphically.

Table 21: Minimum and maximum value and 25th, 50th, 75th and 95th percentile for the risk for water organisms in 2001, considering all active substances applied in all crops

	Lowest RI	p25 of freq	p50 of freq	p75 of freq	p95 of freq	Highest RI
RI value	08.39E-09	1.16E-02	4.77E-01	1.71E+01	8.04E+01	4.52E+03

Boxplot 1: Boxplot of frequencies and the RI values for all the active substances used in 2001 in all the crop groups



50% of the applications presents a risk between 17.1 (percentile 75) and 0.0116 (percentile 25). 50% of the applications presents a risk higher than 0.477 (Median).

The riskiest applications

The active substances for which the RI is higher than the percentile 95 are taken to identify the individually riskiest cases of application for water organisms (i.e. cases corresponding to 5 % of the total frequency of the applications and for which the RI is the largest).

117 cases of application on 918 (concerning 41 active substances out of the 265 studied ones) account for this riskiest 5% of the total frequency of application.

[1] fluvalinate	paraquat	thiram
[4] heptenophos	fluvalinate	methabenzthiazuron
[7] lenacil	fenazaquin	mancozeb
[10] deltamethrin	metiram	dazomet
[13] lenacil	paraquat	heptenophos
[16] deltamethrin	lambda-cyhalothrin	endosulfan
[19] lambda-cyhalothrin	fenbutatin oxide	tri-allate
[22] fenazaquin	chlorotoluron	lenacil
[25] fentin acetate	omethoate	fenpropidin
[28] dimethenamid	deltamethrin	diazinon
[31] bifenox	diazinon	pyridaben
[34] fentin acetate	methabenzthiazuron	methabenzthiazuron
[37] chlorotoluron	paraquat	deltamethrin
[40] deltamethrin	endosulfan	deltamethrin
[43] azocyclotin	paraquat	paraquat
[46] chlorotoluron	bifenox	diazinon
[49] paraquat	bifenthrin	diazinon
[52] oxydemeton methyl	endosulfan	heptenophos

[55]	azocyclotin	flucycloxuron	diflubenzuron
[58]	pyridaben	deltamethrin	parathion
[61]	fenpropidin	fenpropidin	deltamethrin
[64]	parathion	lindane	fentin acetate
[67]	pyrifenox	parathion	chlorotoluron
[70]	deltamethrin	diflubenzuron	dodine
[73]	aclonifen	dodine	aclonifen
[76]	parathion	furathiocarb	parathion
[79]	paraquat	fenpropidin	omethoate
[82]	parathion	monolinuron	paraquat
[85]	diazinon	lindane	lindane
[88]	lindane	parathion	lindane
[91]	parathion	bifenthrin	endosulfan
[94]	monolinuron	carbosulfan	lindane
[97]	carbaryl	lindane	endosulfan
[100]	permethrin	heptenophos	endosulfan
[103]	cypermethrin	lindane	phosalone
[106]	phosalone	cypermethrin	parathion
[109]	deltamethrin	carbaryl	cypermethrin
[112]	flufenoxuron	cypermethrin	cypermethrin
[115]	cypermethrin	flufenoxuron	bifenthrin

9.4 Aggregation of total risk by pesticide groups (2001 ± 1 year)

9.4.1 General

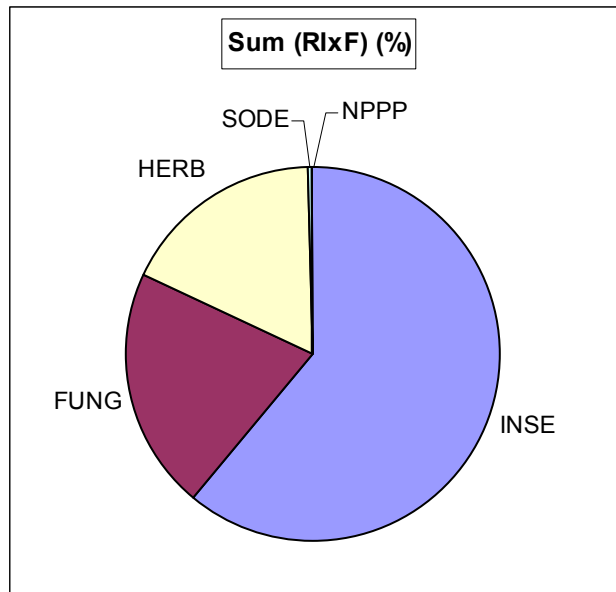
In the table below (Table 22) an overview is given of the frequency F, the risk indices RI, the total risk (RI*F), the 50th percentile (RI Median) and the number of application cases of the 5 different pesticide groups (fungicides “FUNG”, herbicides “HERB”, insecticides “INSE”, soil disinfectants “SODE” and non plant protection products “NPPP”). The frequency (involving the sales and the number of applications per growth season) is the highest for herbicides. Indeed, herbicides are used more than once in a growth season, and they can be applied in every crop. Hence, the sold amounts of herbicides are quite high in comparison with the sales of the other pesticide groups. Concerning the total risk RI per group (without taking the frequency into consideration), the insecticides seem to be the riskiest group for water organisms (77.77% of the total risk), moreover because the number of application cases is not the highest (260 in contrast with 363 for herbicides and 283 for fungicides). Hence, the active substances within the INSE group (or some of them) must have high risk indices. This will be clear when discussing the individual pesticide groups. The total PRIBEL value (RI*F) is also the highest for insecticides. The 50th percentile (RI Median) is also the highest for insecticides. The last column provides the number of application cases, which is the highest for the herbicides.

Pie 1 shows the percentages of each pesticide group to the total risk for water organisms in Belgium in 2001 (equal to the third column in the second part of Table 22). Pie 2 represents the frequency of risk events in the different pesticide groups (equal to the third column in the first part of Table 22).

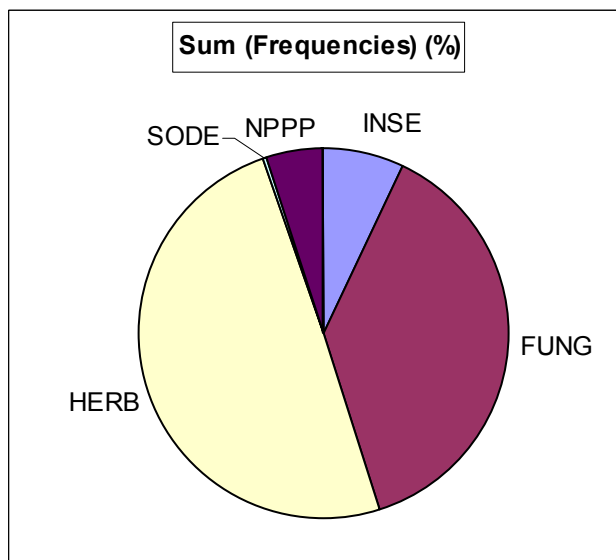
Table 22: Overview of the frequency, the risk indices, the total risk, the 50th percentile (RI Median) and the number of application cases for the different pesticide groups

Crop group	Sum(Freq)	freq %	RI	RI %
INSE	6.21E+05	7.18	7.30 E+04	77.77
FUNG	3.27E+06	37.86	4.90 E+03	8.42
HERB	4.29E+06	49.57	7.93 E+03	5.22
SODE	3.27E+04	0.38	1.40 E+02	0.15
NPPP	4.34E+05	5.02	8.39 E-02	0.000089
Total	8.65E+06	100	9.39 E+04	100

Crop group	Sum(RIxF)	(RIxF) %	RI (Median of Frequency)	Number of application cases
INSE	1.73E+08	60.89	2.06E+01	260
FUNG	6.00E+07	21.11	3.41E+00	283
HERB	5.04E+07	17.73	4.07E-02	363
SODE	7.70E+05	0.27	2.70E+01	10
NPPP	8.24E+03	/	/	3
Total	2.84E+08	100		918

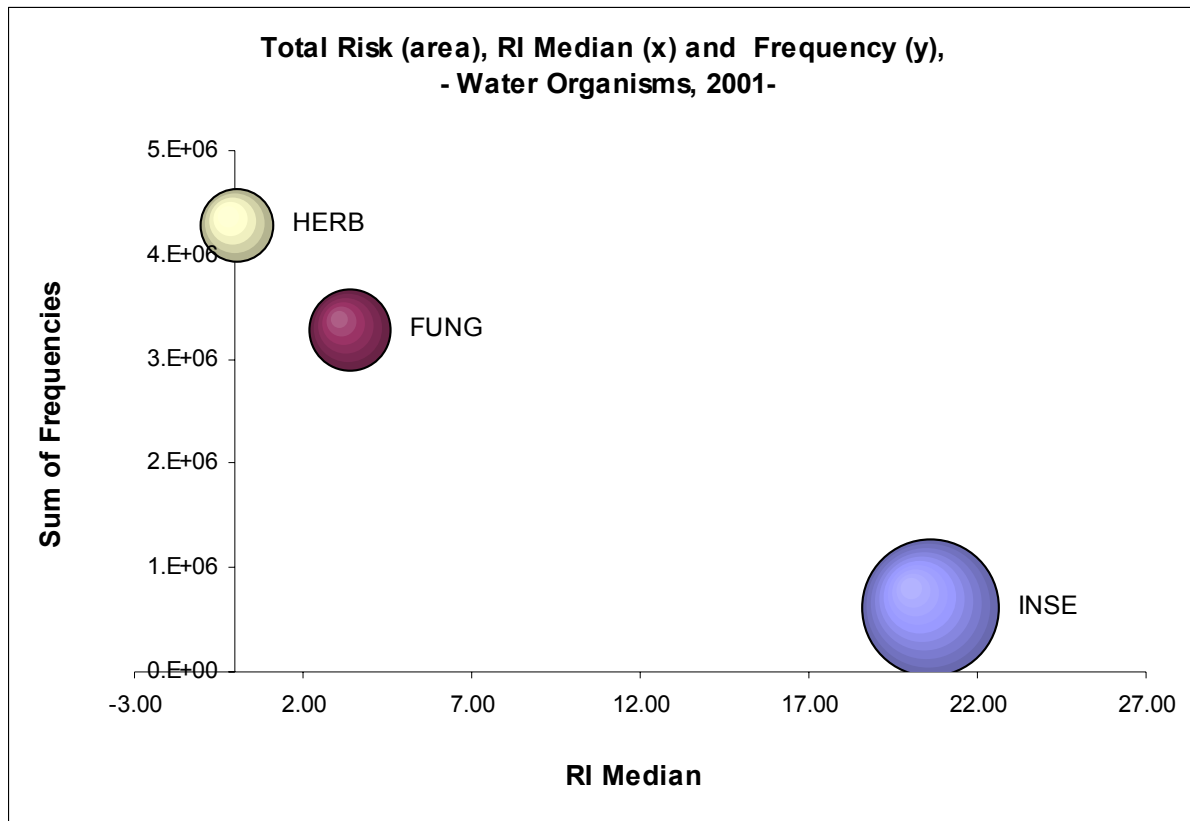


Pie 1: Contribution of each pesticide group to the total risk RI*F on water organisms, Belgium, 2001



Pie 2: Frequency of risk events in the different pesticides groups, water organisms, Belgium, 2001

Another interesting way to analyze the situation in Belgium for the risk for water organisms is to observe bubble graph 1. This figure consists of 3 important parameters: on the X-axis the median risk RI linked with each group, on the Y-axis the frequency of the pesticide groups, and the size of the bubbles gives the PRIBEL-value (risk index * frequency). Because of a too small size, the bubbles for soil disinfectants and NPPP are not represented in the graph. The HERB bubble lies on top of the Y-axis, which corresponds with a high frequency. The size of the red (HERB) and the yellow (FUNG) bubbles is more or less the same and much smaller than the blue one (INSE), which complies with a higher total risk for insecticides. The median risk of the insecticide group is one range higher than the fungicide group and three ranges higher than the herbicide group.

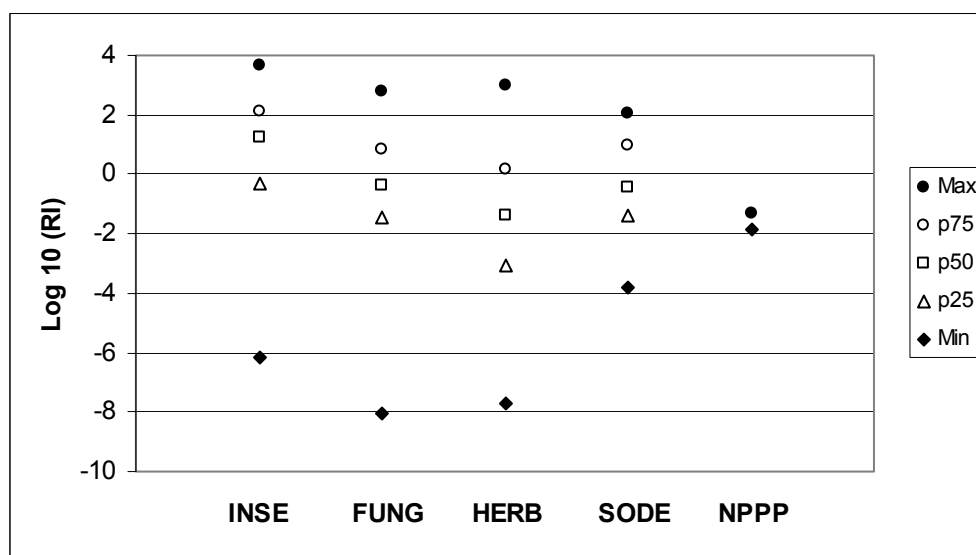


Bubble graph 1: Median risk (X-axis) and sum of frequencies (Y-axis) of each pesticide group and contribution of each group to the total risk (size of bubble $RI * F$) on water organisms, Belgium, 2001

The following Table 23 indicates the extent of the risk indices in each pesticide group as well as the percentiles 25, 50 (median) and 75 of the frequencies of applications. All the values are LOG 10-values. Boxplot 2 summarizes this information graphically. The highest maximum risk belongs to the insecticides; the highest 50th and 75th percentile as well. The herbicide group has the most symmetric distribution.

Table 33: Minimum and maximum values, 25th, 50th en 75th percentiles of each pesticide group (log-values)

Crop group	Max	p75	p50	p25	Min
INSE	3.65E+00	2.14E+00	1.27E+00	-2.98E-01	-6.16E+00
FUNG	2.76E+00	8.17E-01	-3.96E-01	-1.43E+00	-8.08E+00
HERB	3.02E+00	1.47E-01	-1.40E+00	-3.08E+00	-7.74E+00
SODE	2.03E+00	9.72E-01	-4.51E-01	-1.36E+00	-3.78E+00
NPPP	-1.29E+00				-1.86E+00

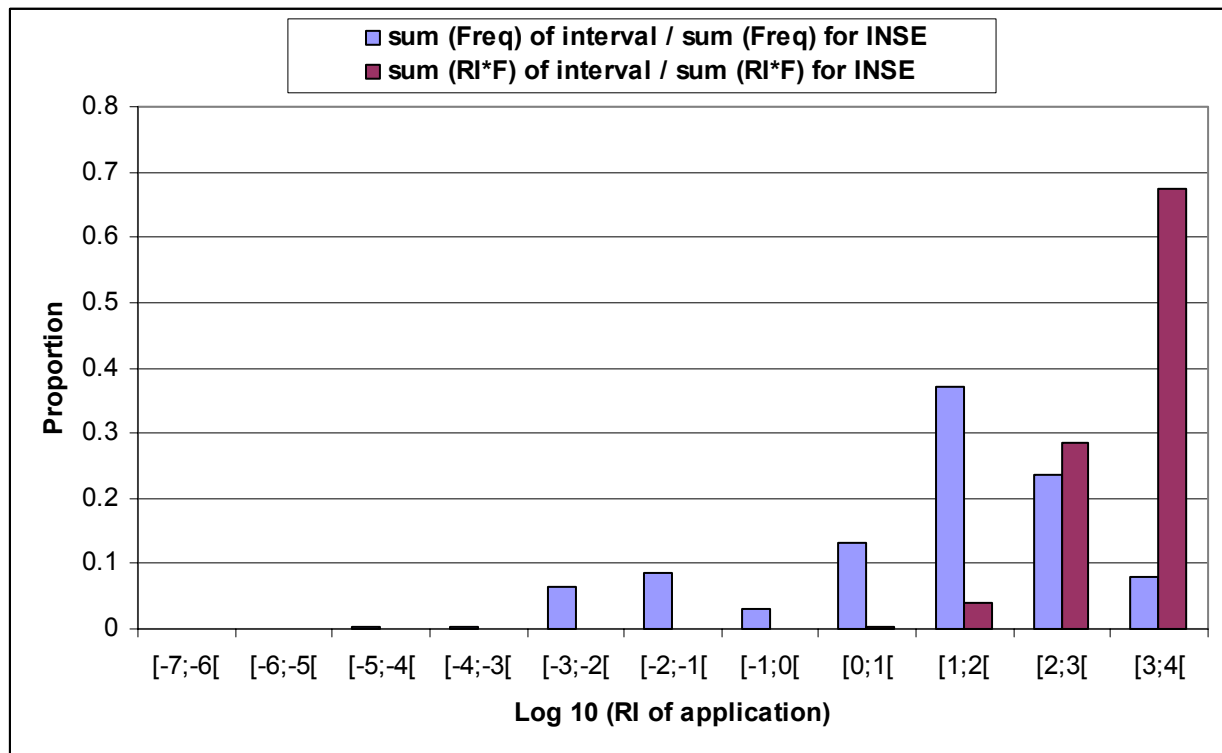
Boxplot 2: Boxplot of frequencies and RI values for the 5 different pesticide groups

9.4.2 Pesticide groups

The 15 riskiest application cases are given for each of the five pesticide groups. These active substances are classified by the total PRIBEL value (RI*F) in a first table, and by their risk index RI (without taking the frequency into account) in a second table. For INSE, FUNG and HERB a histogram is constructed to illustrate the distribution of frequency and total risk.

9.4.2.1 Insecticides

260 application cases have a known RI-value. The distribution of frequency and summed risk are given in Histogram 2.



Histogram2: Distribution of frequency and summed risk of the insecticides used in 2001, for the compartment water organisms

95.84% of the total risk is caused by 31.43% of the frequency of application of insecticides. 73 of the 260 application cases are responsible for this 95.84% (interval [2;4[). When considering the interval [1;3[99.71% of the total risk is covered by 68.66% of the total frequency and 54% of the application cases.

Table 24 gives an overview of the 15 insecticides that have the highest total risk (risk index * frequency). Three active substances are already banned in Belgium: lindane, endosulfan and parathion. Some insecticides mentioned in Table 24 have a relatively small risk index RI (range E+02), but are included in the list because of a high frequency (e.g. deltamethrin in cereal). The 15 insecticides shown in Table 25 all have a risk index in the range E+03. Cypermethrin is repeated 6 times in different crops. The disparities between the RI's of cypermethrin applied in different crops are small, but due to a different number of applications and different sales, the total PRIBEL value RI*F can differ a lot (range E+07 for cypermethrin used in potato, apple and winterwheat; whereas range E+05 for application on grassland). The reason of the differences between the RI's for the same active substance used in different crops is twofold: there is the difference in application dose (Van Lierde *et al.*) and there are the differences in the parameters intrinsic to each crop (e.g. interception factor).

Table 24: Overview of the application cases that have the highest contribution to the total risk RI*F

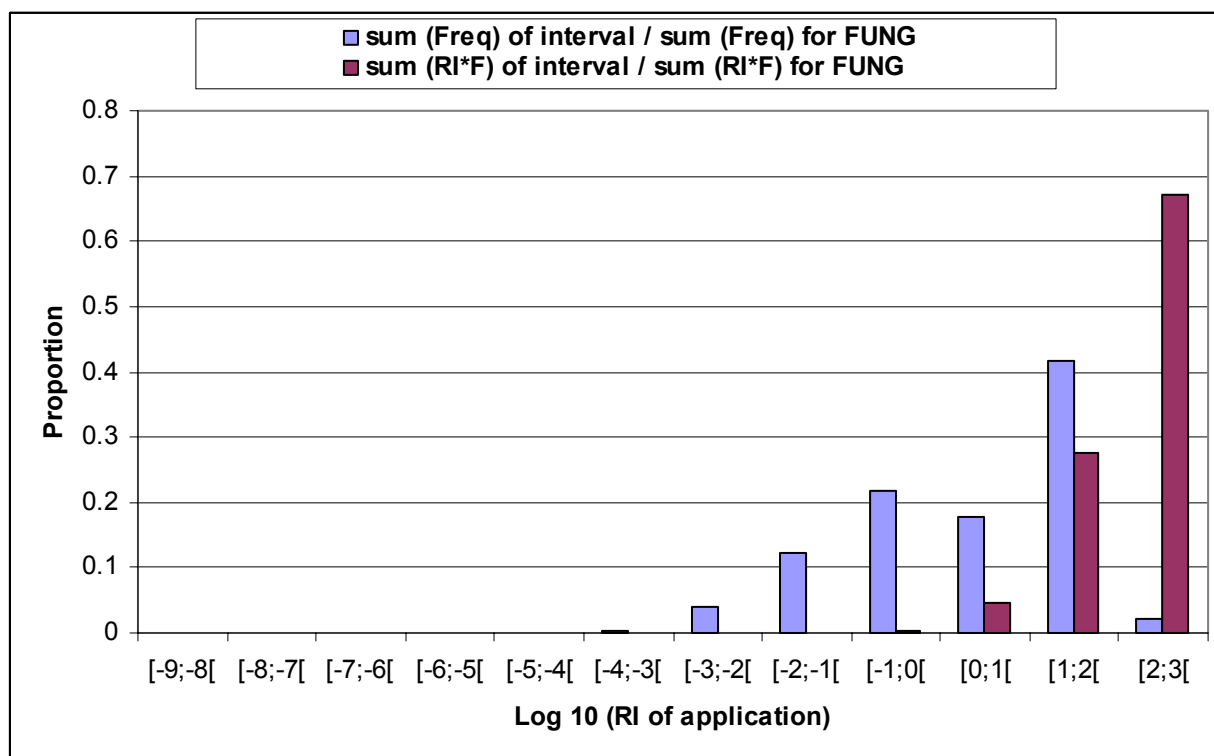
AS name	crop	crop group	frequency	RI water org	RI*F
cypermethrin	apple	orchard	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	pear	orchard	> 1E+03	4.19E+03	> 1E+07
cypermethrin	potato	potato	> 1E+03	3.98E+03	> 1E+07
lindane	sugarbeet	sugar	1.03 E+04	1.16E+03	1.19 E+07
cypermethrin	winterwheat	cereal	> 1E+03	1.98E+03	> 1E+07
cypermethrin	winterbarley	cereal	> 1E+03	2.97E+03	> 1E+06
cypermethrin	sugarbeet	sugar	> 1E+03	3.98E+03	> 1E+06
flufenoxuron	apple	orchard	> 1E+03	3.29E+03	> 1E+06
bifenthrin	flax	industrial	> 1E+03	4.52E+03	> 1E+06
lindane	maize	maize	8.55 E+03	6.40E+02	5.47 E+06
deltamethrin	carrot	vegetables	> 1E+03	2.13E+03	> 1E+06
endosulfan	apple	orchard	4.48 E+03	9.25E+02	4.14 E+06
diazinon	sugarbeet	sugar	> 1E+04	2.22E+02	> 1E+06
parathion	potato	potato	3.56 E+03	8.93E+02	3.18 E+06
deltamethrin	winterwheat	cereal	> 1E+04	1.81E+02	> 1E+06

Table 25: Overview of the application cases that have the highest risk indices RI

AS name	crop	crop group	frequency	RI	RI*F
bifenthrin	flax	industrial	> 1E+03	4.52E+03	> 1E+06
flufenoxuron	pear	orchard	> 1E+03	4.19E+03	> 1E+07
cypermethrin	sugarbeet	sugar	> 1E+03	3.98E+03	> 1E+06
cypermethrin	potato	potato	> 1E+03	3.98E+03	> 1E+07
cypermethrin	apple	orchard	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	apple	orchard	> 1E+03	3.29E+03	> 1E+06
cypermethrin	winterbarley	cereal	> 1E+03	2.97E+03	> 1E+06
carbaryl	pear	orchard	> 1E+02	2.84E+03	> 1E+06
deltamethrin	carrot	vegetables	> 1E+03	2.13E+03	> 1E+06
parathion	leek	vegetables	1.44 E+03	2.00E+03	2.88 E+06
cypermethrin	winterwheat	cereal	> 1E+03	1.98E+03	> 1E+07
phosalone	pear	orchard	> 1E+03	1.98E+03	> 1E+06
phosalone	apple	orchard	> 1E+02	1.86E+03	> 1E+06
lindane	winterbarley	cereal	4.25 E+02	1.80E+03	2.59 E+05
cypermethrin	permanent grassland	fodder	> 1E+01	1.70E+03	> 1E+05

9.4.2.2. Fungicides

283 application cases have a known RI-value. The distribution of frequency and summed risk is shown in Histogram 3.



Histogram 3: Distribution of frequency and summed risk of the fungicides used in 2001, for the compartment water organisms

94.75% of the total risk is generated by 21% of the analysed risk events and 44.07% of the frequency of application of fungicides (interval [1;3[in Histogram 3).

Table 26 gives the 15 fungicides that have the highest total risk (RI*F) for water organisms in 2001. Mancozeb applied in potato heads the list with an RI*F in the range E+07, although the RI is quite low (not included in Table 27 with the 15 highest RI's). The reason is the very huge sales of mancozeb in potato. Fenpropodim in potato is number one in Table 22, but due to a small frequency it is not implied in Table 26.

Table 26 and 27 only have 7 active substances in common. This shows the benefits of using both tables (classifying in order of RI*F and the pure RI): active substances may have a high risk index, but when applied only a few times and when the sold amounts in Belgium are relatively low (a few hundred or thousand kilograms), the total PRIBEL value RI*F will be small, meaning that although the substance is riskful, the risk for the Belgian people in general is quite low (e.g. pyrifenoxy in apple). The opposite is also true: an active substance having a small RI may be ordered as riskful on national scale because of high sales and a huge number of applications per year (e.g. mancozeb in potatoes).

Table 26: Overview of the application cases that have the highest contribution to the total risk RI*F

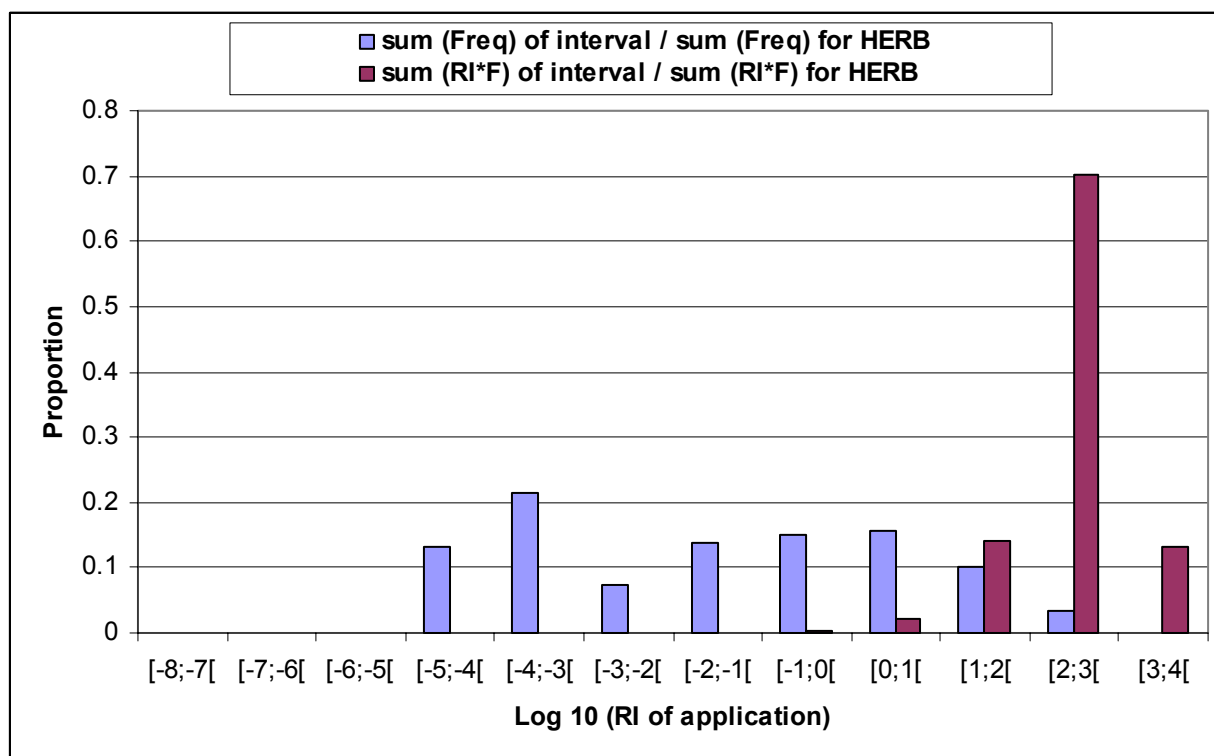
AS name	crop	crop group	frequency	RI	RI*F
mancozeb	potato	potato	7.36E+05	2.46E+01	1.81 E+07
dodine	apple	orchard	> 1E+04	3.75E+02	> 1E+06
dodine	pear	orchard	> 1E+04	3.90E+02	> 1E+06
fentin hydroxyde	potato	potato	2.06 E+05	2.00E+01	4.12 E+06
fenpropidin	winterwheat	cereal	> 1E+04	1.43E+02	> 1E+06
thiram	pear	orchard	> 1E+04	7.37E+01	> 1E+06
thiram	apple	orchard	> 1E+04	7.41E+01	> 1E+06
trifloxystrobine	winterwheat	cereal	> 1E+04	2.42E+01	> 1E+06
fenpropidin	sugarbeet	sugar	> 1E+03	2.85E+02	> 1E+06
fentin acetate	potato	potato	> 1E+03	3.48E+02	> 1E+06
fenpropidin	winterbarley	cereal	> 1E+03	2.95E+02	> 1E+06
chlorothalonil	potato	potato	> 1E+04	5.41E+01	> 1E+05
tolyfluanide	apple	orchard	> 1E+04	3.06E+01	> 1E+05
cyprodinil	winterbarley	cereal	> 1E+04	3.93E+01	> 1E+05
tolyfluanide	pear	orchard	> 1E+04	3.51E+01	> 1E+05

Table 27: Overview of the application cases that have the highest risk indices RI

AS name	crop	crop group	frequency	RI	RI*F
fenpropidin	potato	potato	> 1E+02	5.72E+02	> 1E+04
dodine	pear	orchard	> 1E+04	3.90E+02	> 1E+06
dodine	apple	orchard	> 1E+04	3.75E+02	> 1E+06
pyrifenox	apple	orchard	> 1E+00	3.56E+02	> 1E+03
fentin acetate	potato	potato	> 1E+03	3.48E+02	> 1E+06
fenpropidin	winterbarley	cereal	> 1E+03	2.95E+02	> 1E+06
fenpropidin	sugarbeet	sugar	> 1E+03	2.85E+02	> 1E+06
fentin acetate	sugarbeet	sugar	> 1E+02	1.71E+02	> 1E+04
fenpropidin	winterwheat	cereal	> 1E+04	1.43E+02	> 1E+06
fentin acetate	leek	vegetables	> 1E+01	1.42E+02	> 1E+03
metiram	leek	vegetables	> 1E+01	1.07E+02	> 1E+03
mancozeb	corn	maize	1.56 E+02	1.01E+02	1.57 E+04
	bean without				
thiram	pod	vegetables	> 1E+03	8.51E+01	> 1E+05
thiram	apple	orchard	> 1E+04	7.41E+01	> 1E+06

9.4.2.3 Herbicides

363 application cases have a known RI-value. The distribution of frequency and summed risk is shown in Histogram 4.



Histogram 4: Distribution of frequency and summed risk of the herbicides used in 2001, for the compartment water organisms

83.40% of the total risk is generated by only 6% of the analysed risk events and 3.25% of the frequency of application of herbicides (interval [2;4[in Histogram 4). When considering the interval [1;4[97.65% of the total risk is covered by 13.35% of the frequency and 13% of the application cases. Contrary to the histograms of insecticides and fungicides, the majority of the frequency is situated in the middle of the histogram instead of a predominance at the right side of the x-axis. Only 13% of the application cases is set in the last 3 columns [1;4[. This is a much smaller proportion than for insecticides (54%) and fungicides (21%), meaning that there are only a few active substances within the herbicide group having a high risk for water organisms. The majority of the herbicides applied in Belgium in 2001 has a small risk for water organisms. This was also illustrated in Bubble graph 1.

Table 28 gives the 15 herbicides having the highest total risk RI*F; in Table 29 an overview of the application cases with the highest RI is represented. Paraquat is listed 6 times in Table 29, but only mentioned once in Table 28 because of having a low frequency –with the exception of paraquat used in potato. Other herbicides with a high risk for water organisms are monolinuron (2 times), chlorotoluron (3 times) and acetonifin (2 times). Monolinuron is already banned in Belgium.

Table 28: Overview of the application cases that have the highest contribution to the total risk

AS name	crop	crop group	frequency	RI	RI*F
lenacil	flax	industrial	1.10 E+04	9.77E+01	1.08 E+06
bifenox	winterwheat	cereal	> 1E+03	1.60E+02	> 1E+06
paraquat	potato	potato	> 1E+03	1.75E+02	> 1E+06
chlorotoluron	winterwheat	cereal	> 1E+03	1.74E+02	> 1E+06
metribuzin	potato	potato	4.31 E+04	3.91E+01	1.69 E+06
methabenzthiazuron	winter barley	cereal	> 1E+04	1.71E+02	> 1E+06
monolinuron	potato	potato	4.24 E+03	6.00E+02	2.54 E+06
metamitron	sugarbeet	sugar	9.84 E+04	2.63E+01	2.59 E+06
pro sulfocarb	potato	potato	> 1E+04	6.17E+01	> 1E+06
dimethenamid	maize	maize	> 1E+04	3.44E+01	> 1E+06
pro sulfocarb	winterbarley	cereal	> 1E+04	6.83E+01	> 1E+06
acлонifen	pea without pod	vegetables	> 1E+03	3.82E+02	> 1E+06
lenacil	sugarbeet	sugar	3.54 E+04	1.09E+02	3.87 E+06
acлонifen	potato	potato	> 1E+04	3.94E+02	> 1E+06
chlorotoluron	winterbarley	cereal	> 1E+04	3.59E+02	> 1E+06

Table 29: Overview of the application cases that have the highest risk indices RI

AS name	crop	crop group	frequency	RI	RI*F
monolinuron	pear	orchard	3.03 E+00	1.04E+03	3.14 E+03
paraquat	chicory	sugar	> 1E+03	6.07E+02	> 1E+05
monolinuron	potato	potato	4.24 E+03	6.00E+02	2.54 E+06
paraquat	winterbarley	cereal	> 1E+01	5.60E+02	> 1E+04
acлонifen	potato	potato	> 1E+04	3.94E+02	> 1E+06
acлонifen	pea without pod	vegetables	> 1E+03	3.82E+02	> 1E+06
chlorotoluron	winterbarley	cereal	> 1E+04	3.59E+02	> 1E+06
paraquat	apple	orchard	> 1E+03	2.25E+02	> 1E+05
bifenox	winterbarley	cereal	> 1E+03	2.18E+02	> 1E+05
chlorotoluron	pear	orchard	> 1E+03	2.03E+02	> 1E+05
paraquat	leek	vegetables	> 1E+02	2.00E+02	> 1E+04
paraquat	pear	orchard	> 1E+03	1.96E+02	> 1E+05
paraquat	potato	potato	> 1E+03	1.75E+02	> 1E+06
chlorotoluron	winterwheat	cereal	> 1E+03	1.74E+02	> 1E+06
methabenzthiazuron	winterwheat	cereal	> 1E+02	1.71E+02	> 1E+05

9.4.2.4 Soil disinfectants

Only 10 application cases have a known RI-value. A histogram is not relevant because of a too low number of applications.

With exception of dazomet and metam-natrium the soil disinfectants have rather small risk indices for water organisms (Table 31). Most of the soil disinfectants are applied in greenhouse crops. In Table 30 it can be noticed that only metam-natrium used in leek has a relatively high total risk R*F.

Table 30: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	crop group	frequency	RI	RI*F
metam-natrium	leek	vegetables	> 1E+04	2.70E+01	> 1E+05
dazomet	leek	vegetables	> 1E+02	1.08E+02	> 1E+04
1,3-dichloropropene	leek	vegetables	> 1E+03	3.54E-01	> 1E+02
methyl bromide	greenhouse	greenhouse	> 1E+02	8.95E-01	> 1E+02
	vegetables				
1,3-dichloropropene	greenhouse	greenhouse	> 1E+03	1.01E-01	> 1E+02
	vegetables				
sulfotep	greenhouse	greenhouse	> 1E+01	3.51E+00	> 1E+01
	vegetables				
chloropicrin	greenhouse	greenhouse	> 1E+02	8.69E-02	> 1E+00
	vegetables				
dazomet	vegetables	greenhouse	> 1E+01	2.95E-02	> 1E-01
oxamyl	potato storage	potato	> 1E+03	4.56E-04	> 1E-01
oxamyl	greenhouse	greenhouse	> 1E+02	1.66E-04	> 1E-02
	vegetables				

Table 31: Overview of the application cases that have the highest risk indices RI

AS name	crop	crop group	frequency	RI	RI*F
dazomet	leek	vegetables	> 1E+02	1.08E+02	> 1E+04
metam-natrium	leek	vegetables	> 1E+04	2.70E+01	> 1E+05
	greenhouse				
sulfotep	vegetables	greenhouse	> 1E+01	3.51E+00	> 1E+01
	greenhouse				
methyl bromide	vegetables	greenhouse	> 1E+02	8.95E-01	> 1E+02
1,3-dichloropropene	leek	vegetables	> 1E+03	3.54E-01	> 1E+02
	greenhouse				
1,3-dichloropropene	vegetables	greenhouse	> 1E+03	1.01E-01	> 1E+02
	greenhouse				
chloropicrin	greenhouse	greenhouse	> 1E+02	8.69E-02	> 1E+00
	vegetables				
dazomet	vegetables	greenhouse	> 1E+01	2.95E-02	> 1E-01
oxamyl	potato storage	potato	> 1E+03	4.56E-04	> 1E-01
oxamyl	greenhouse	greenhouse	> 1E+02	1.66E-04	> 1E-02
	vegetables				

9.4.2.5 Non plant protection products

Because of a lack of ecotoxicological data, only 3 application cases have a known RI-value. A histogram is not relevant because of a too low number of applications. The risks RI even as the total risks RI*F are very low for the mentioned nppp in Table 32. Due to the incomplete data about nppp, this group is not considered as a full valuable group in this study.

Table 32: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	crop group	frequency	RI	RI*F
anthraquinone	winterwheat	cereal	> 1E+05	1.38E-02	> 1E+03
chlorpropham	potato	potato	> 1E+04	5.15E-02	> 1E+03
streptomycin	pear	orchard	> 1E+03	1.86E-02	> 1E+01

9.5 Aggregation of total risk by crop groups (2001 ± 1 year)

9.5.1 General

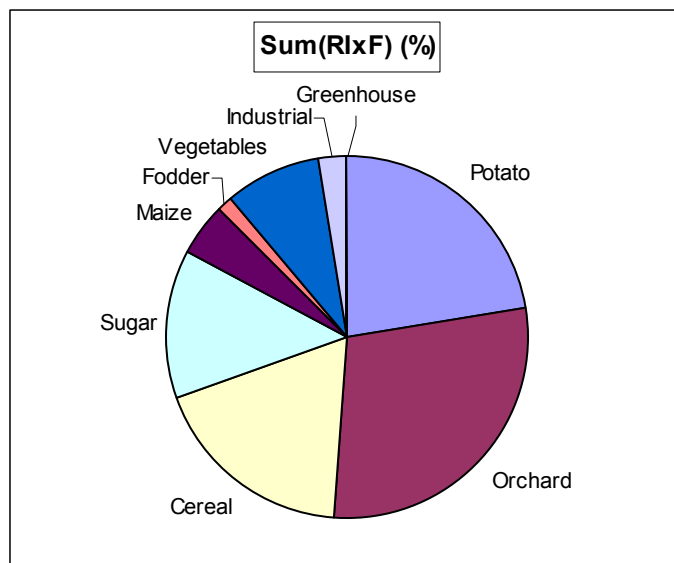
In the table below (Table 33) an overview is given of the frequency F, the risk indices RI, the total risk (RI*F), the 50th percentile (RI Median) and the number of application cases of the 9 different crop groups (potato, orchard, cereal, sugarbeet, maize, fodder, vegetables, industrial crops and greenhouse crops). The frequency (involving the sales and the number of applications per growth season) is the highest for cereal, followed by potatoes. Indeed, a whole spectrum of products is used in the afore-mentioned crops, some products are applied many times a year (e.g. mancozeb in potatoes) and the hectares cereals and potatoes are the largest of all the crops in Belgium. Hence, the sold amounts of products used in those two crops are quite high. Concerning the total risk RI per group (without taking the frequency into consideration), orchard heads the list (34.4%). The number of application cases is also the highest for orchard (195). The number two is cereal with 174 application cases although having a total risk index RI of 15.03%. This means that there are a lot of products applied in cereal which have rather small risk indices. Indeed, the majority of products used in cereal belongs to the herbicides group (44%) whereas there are only 18% application cases that have a higher risk for water organisms, namely insecticides (see also Table 22 and Pie 1). In orchard on the other hand, 33% of the application cases involve insecticides and 35% herbicides. The total PRIBEL value (RI*F) is also the highest for orchard. The 50th percentile (RI Median) is the highest for the active substances used in sugarbeet.

Pie 3 shows the percentages of each crop group to the total risk for water organisms in Belgium in 2001 (equal to the third column in the second part of Table 33). Pie 4 represents the frequency of risk events in the different crop groups (equal to the third column in the first part of Table 33).

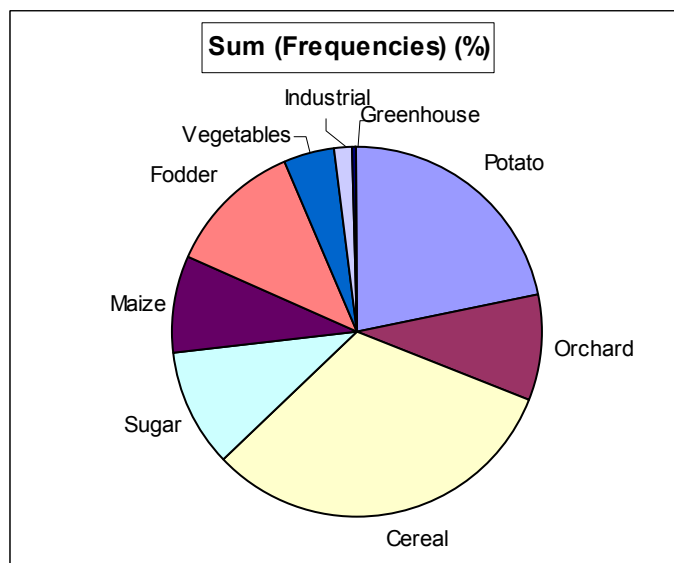
Table 33: Overview of the frequency, the risk indices, the total risk, the 50th percentile (RI Median) and the number of application cases for the different crop groups

Crop group	Sum(Freq)	freq %	RI	RI %
Potato	1.90E+06	21.92	1.05E+04	12.22
Orchard	7.86E+05	9.07	2.94E+04	34.14
Cereal	2.75E+06	31.72	1.29E+04	15.03
Sugarbeet	9.00E+05	10.39	9.61E+03	11.18
Maize	7.53E+05	8.70	3.78E+03	4.40
Fodder	1.02E+06	11.77	3.05E+03	3.55
Vegetables	3.91E+05	4.51	1.20E+04	13.97
Industrial crops	1.40E+05	1.62	4.71E+03	5.47
Greenhouse crops	2.61E+04	0.30	2.65E+01	0.03
Total	8.66E+06	100	8.60E+04	100.00

Crop group	Sum(RIxF)	(RIxF) %	RI (Median of Frequency)	Number of applications
Potato	6.37E+07	22.41	1.71E+00	81
Orchard	8.17E+07	28.75	1.45E+00	195
Cereal	5.22E+07	18.37	4.30E-01	174
Sugarbeet	3.80E+07	13.37	1.99E+00	110
Maize	1.31E+07	4.61	4.23E-01	71
Fodder	3.77E+06	1.33	3.36E-03	58
Vegetables	2.43E+07	8.55	1.48E+00	120
Industrial crops	7.44E+06	2.62	6.09E-01	19
Greenhouse crops	2.73E+03	0.00	3.35E-03	88
Total	2.84E+08	100		918

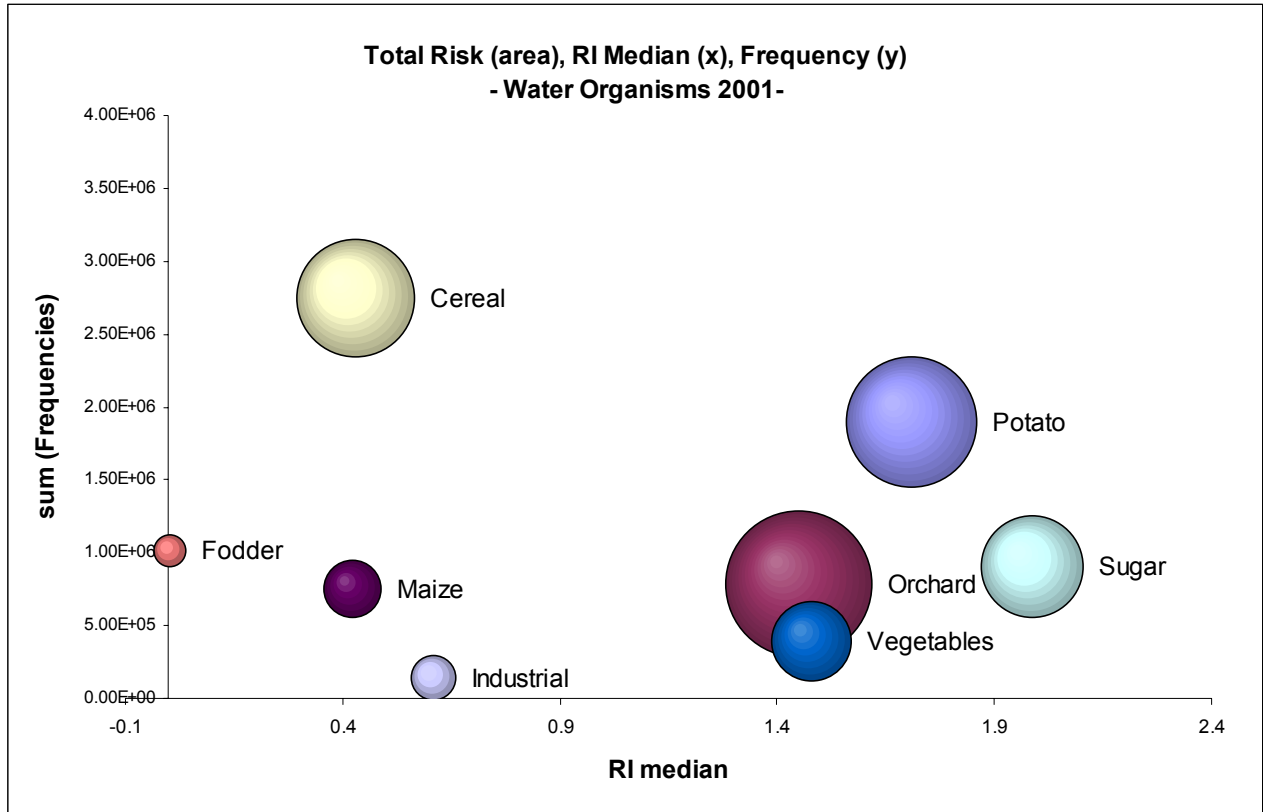


Pie 3: Contribution of the crop groups to the total risk on water organisms, Belgium, 2001



Pie 4: Frequency of risk events for water organisms in the different crop groups, Belgium, 2001

The information summarized in Table 33 is also useful to create a bubble graph. Because of a too small size, the bubble for greenhouse crops is not represented in the graph. The cereal bubble lies on top of the Y-axis, which corresponds with a high frequency. The size of the red (orchard), the purple (potato), the yellow (cereal) and the green (sugarbeet) is more or less the same and bigger than the other ones, which complies with a higher total risk for the 4 afore-mentioned crop groups. The median risk changes from E-03 to E+00.

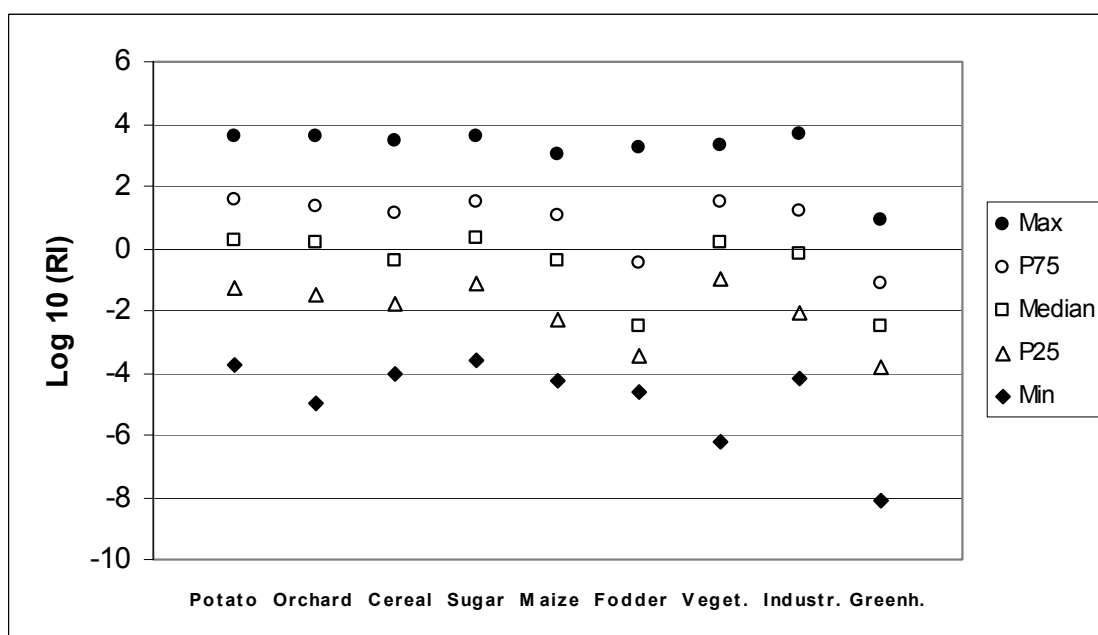


Bubble graph 2: Median risk (X) and sum of frequencies (Y) of each crop group and contribution of each group to the total risk (size of bubble, sum(RIxF)) on water organisms, Belgium, 2001

The following Table 34 indicates the extent of the risk index values in each crop group as well as the percentiles 25, 50 (median) and 75 of the frequencies of applications. All the values are LOG 10-values. Boxplot 3 summarizes this information graphically. The maximum risks are more or less the same for the different crop groups (with exception of greenhouse crops). Potato, cereal, sugarbeet and maize have a similar distribution which is also quite symmetric around the 50th percentile.

Table 34: Minimum and maximum values, 25th, 50th en 75th percentiles of each crop group (log-values)

Crop group	Max	P75	Median	P25	Min
Potato	3.60E+00	1.59E+00	2.33E-01	-1.29E+00	-3.74E+00
Orchard	3.62E+00	1.34E+00	1.61E-01	-1.47E+00	-5.00E+00
Cereal	3.47E+00	1.16E+00	-3.66E-01	-1.80E+00	-4.05E+00
Sugar	3.60E+00	1.51E+00	2.98E-01	-1.12E+00	-3.58E+00
Maize	3.03E+00	1.02E+00	-3.73E-01	-2.28E+00	-4.26E+00
Fodder	3.23E+00	-4.59E-01	-2.47E+00	-3.43E+00	-4.64E+00
Vegetables	3.33E+00	1.48E+00	1.70E-01	-9.69E-01	-6.24E+00
Industrial	3.65E+00	1.17E+00	-2.16E-01	-2.06E+00	-4.18E+00
Greenhouse	9.15E-01	-1.11E+00	-2.47E+00	-3.80E+00	-8.08E+00

Boxplot 3: Boxplots of Frequencies and the RI values for the nine different crop groups

9.5.2 Crop groups

In the same way as for the pesticide groups, the 15 riskiest application cases are given for each of the nine crop groups. These active substances are classified by the total PRIBEL value (RI*F) in a first table, and by their risk index RI (without taking the frequency into account) in a second table. Only for orchard a histogram is constructed. The highest amount of application cases occurs in orchard, and a lot of insecticides (which have high risk indices for water organisms) are used in apple and pear trees.

9.5.2.1 Potatoes

81 application cases have a known RI-value. Table 35 shows the 15 application cases which have the highest total PRIBEL value, this is RI*F. When considering the total PRIBEL value, the fungicide mancozeb heads the list. It is obvious that the reason is the high sales (represented in the huge frequency) and not the pure risk index (2.46 E+01) which is

relatively low. In Table 36 with the ranking of the risk indices, mancozeb even has no mention in the top 15.

The highest risk indices belong to four insecticides: cypermethrin, lindane, parathion and diazinon (Table 36). Three of them have a relatively high frequency and are consequently mentioned in Table 35 as well; lindane has a relatively low frequency ($> 1E+02$) and is not included in Table 36. Lindane and parathion are already banned on the Belgian market. 10 of the 15 active substances in Table 36 are insecticides, this is a trend that will come back in all the following crops.

Table 35: Overview of the application cases that have the highest contribution to the total risk RI*F

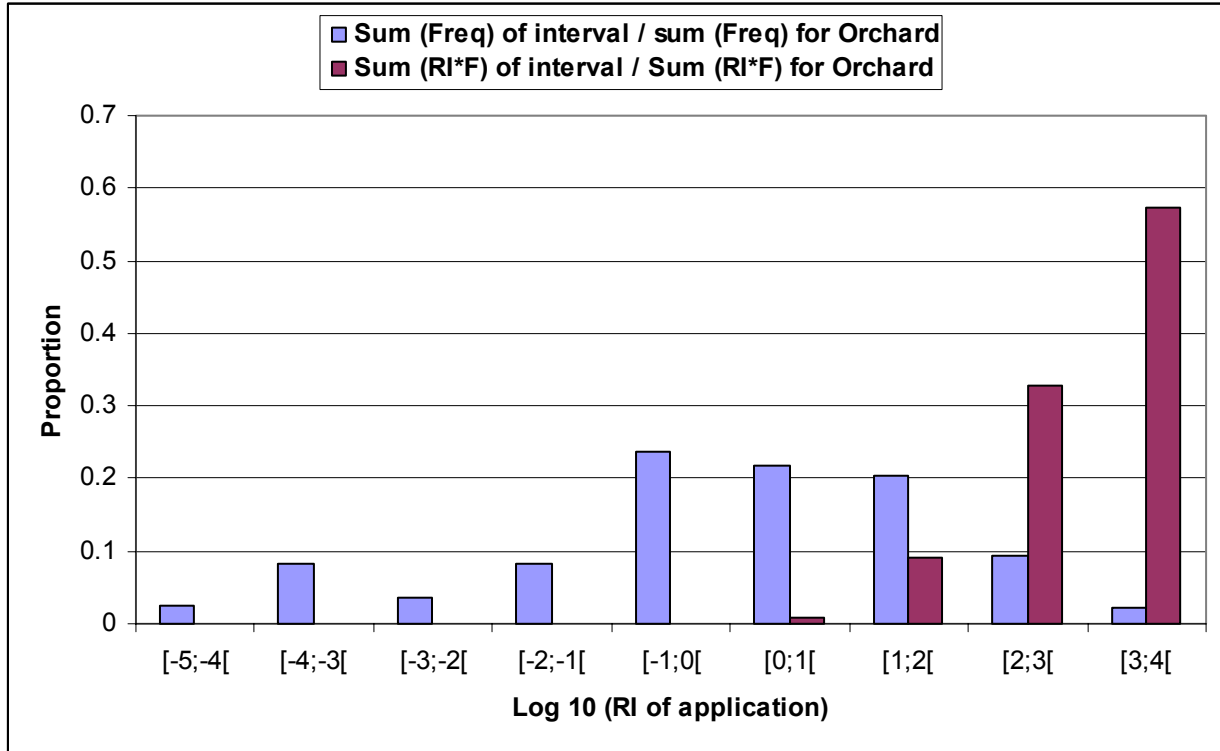
AS name	crop	pesticide group	frequency	RI	RI*F
mancozeb	potato	FUNG	7.36 E+05	2.46E+01	1.81 E+07
cypermethrin	potato	INSE	$> 1E+03$	3.98E+03	$> 1E+07$
aclonifen	potato	HERB	$> 1E+04$	3.94E+02	$> 1E+06$
fentin hydroxyde	potato	FUNG	2.06 E+05	2.00E+01	4.12 E+06
parathion	potato	INSE	3.56 E+03	8.93E+02	3.18 E+06
deltamethrin	potato	INSE	$> 1E+03$	3.64E+02	$> 1E+06$
prosulcarb	potato	HERB	$> 1E+04$	6.17E+01	$> 1E+06$
monolinuron	potato	HERB	4.24 E+03	6.00E+02	2.54 E+06
diazinon	potato	INSE	$> 1E+03$	6.20E+02	$> 1E+06$
endosulfan	potato	INSE	9.50 E+03	2.40E+02	2.28 E+06
metribuzin	potato	HERB	$> 1E+04$	3.91E+01	$> 1E+06$
paraquat	potato	HERB	$> 1E+03$	1.75E+02	$> 1E+06$
fentin acetate	potato	FUNG	$> 1E+03$	3.48E+02	$> 1E+06$
chlorothalonil	potato	FUNG	$> 1E+04$	5.41E+01	$> 1E+05$
heptenophos	potato	INSE	$> 1E+03$	2.41E+02	$> 1E+05$

Table 36: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	potato	INSE	$> 1E+03$	3.98E+03	$> 1E+07$
lindane	potato	INSE	3.14 E+02	1.08E+03	3.40 E+05
parathion	potato	INSE	3.56 E+03	8.93E+02	3.18 E+06
diazinon	potato	INSE	$> 1E+03$	6.20E+02	$> 1E+06$
monolinuron	potato	HERB	4.24 E+03	6.00E+02	2.54 E+06
fenpropidin	potato	FUNG	$> 1E+02$	5.72E+02	$> 1E+04$
aclonifen	potato	HERB	$> 1E+04$	3.94E+02	$> 1E+06$
deltamethrin	potato	INSE	$> 1E+03$	3.64E+02	$> 1E+06$
fentin acetate	potato	FUNG	$> 1E+03$	3.48E+02	$> 1E+06$
heptenophos	potato	INSE	$> 1E+03$	2.41E+02	$> 1E+05$
endosulfan	potato	INSE	9.50 E+03	2.40E+02	2.28 E+06
oxydemeton methyl	potato	INSE	$> 1E+03$	2.34E+02	$> 1E+05$
paraquat	potato	HERB	$> 1E+03$	1.75E+02	$> 1E+06$
fluvalinate	potato	INSE	$> 1E+02$	7.27E+01	$> 1E+04$
chlorpyrifos	potato	INSE	$> 1E+03$	7.12E+01	$> 1E+05$

9.5.2.2 Orchard

195 application cases have a known RI-value. As being the most interesting crop group for creating a histogram (highest amount of application cases and many insecticides used), the distribution of frequency and summed risk are given in Histogram 5.



Histogram 5: Distribution of frequency and summed risk of all the pesticides used in 2001 in orchard, for the compartment water organisms

90.2% of the risk on water organisms in 2001 is generated by 16% of the analysed risk events and 11.6% of the frequency. These are shown in the last 2 categories of histogram 1, namely the interval [2;4[. 99.1% of the total risk for water organisms is caused by 32.0% of the total frequency and 30% of the application cases (interval [1;4[in Histogram 5).

Table 37 encompasses 11 insecticides and 4 fungicides. Some active substances, like flufenoxuron, are mentioned 2 times in the list. This is because of the division made between apple trees and pear trees (on the basis of the inquiries of Van Lierde *et al*). Flufenoxuron and cypermethrin top both Table 37 and 38. This is mainly due to the small MTC-values (Maximum Tolerable Concentration; endpoint used in PRIBEL for water organisms) for both active substances. A high risk index combined with a high frequency results in a position on top of Table 37 about the total PRIBEL values RI*F. The fungicide thiram is despite a relatively low RI on place 7 (pear) and 11 (apple) in Table 37. The cause is the high sales of thiram in 2001 for application in orchards.

Table 37: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	apple	INSE	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	pear	INSE	> 1E+03	4.19E+03	> 1E+07
dodine	apple	FUNG	> 1E+04	3.75E+02	> 1E+06
flufenoxuron	apple	INSE	> 1E+03	3.29E+03	> 1E+06
dodine	pear	FUNG	> 1E+04	3.90E+02	> 1E+06
endosulfan	apple	INSE	4.48 E+03	9.25E+02	4.14 E+06
thiram	pear	FUNG	> 1E+04	7.37E+01	> 1E+06
carbaryl	pear	INSE	> 1E+02	2.84E+03	> 1E+06
carbaryl	apple	INSE	> 1E+03	1.11E+03	> 1E+06
endosulfan	pear	INSE	2.04 E+03	1.23E+03	2.52 E+06
thiram	apple	FUNG	> 1E+04	7.41E+01	> 1E+06
phosalone	pear	INSE	> 1E+03	1.98E+03	> 1E+06
deltamethrin	apple	INSE	> 1E+03	3.15E+02	> 1E+06
parathion	apple	INSE	2.51 E+03	7.29E+02	1.83 E+06
phosalone	apple	INSE	> 1E+02	1.86E+03	> 1E+06

Table 38: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
flufenoxuron	pear	INSE	> 1E+03	4.19E+03	> 1E+07
cypermethrin	apple	INSE	> 1E+03	3.78E+03	> 1E+07
flufenoxuron	apple	INSE	> 1E+03	3.29E+03	> 1E+06
carbaryl	pear	INSE	> 1E+02	2.84E+03	> 1E+06
phosalone	pear	INSE	> 1E+03	1.98E+03	> 1E+06
phosalone	apple	INSE	> 1E+02	1.86E+03	> 1E+06
endosulfan	pear	INSE	2.04 E+03	1.23E+03	2.52 E+06
carbaryl	apple	INSE	> 1E+03	1.11E+03	> 1E+06
monolinuron	pear	HERB	3.03 E+00	1.04E+03	3.14 E+03
endosulfan	apple	INSE	4.48 E+03	9.25E+02	4.14 E+06
parathion	apple	INSE	2.51 E+03	7.29E+02	1.83 E+06
omethoate	pear	INSE	> 1E+01	5.74E+02	> 1E+04
dodine	pear	FUNG	> 1E+04	3.90E+02	> 1E+06
dodine	apple	FUNG	> 1E+04	3.75E+02	> 1E+06
diflubenzuron	pear	INSE	2.37 E+03	3.71E+02	8.78 E+05

9.5.2.3 Cereal

174 application cases have a known RI-value. The crop group cereal consists of winterbarley and winterwheat, and most of the active substances mentioned in Table 39 that have a high risk for one crop (barley/wheat) also manifest a high risk for the other crop (wheat/barley). For instance cypermethrin, lindane, parathion, bifenthrin, chlorotoluron and deltamethrin have a mention for both the crops barley and wheat. Nevertheless there can be a difference in the risk index for water organisms depending on the crop. This is due to a different application rate, e.g. the dose for lindane in winterbarley is 1.5 kg/ha, whereas it is 0.5 kg/ha in winterwheat (Van Lierde).

Table 39: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	winterwheat	INSE	> 1E+03	1.98E+03	> 1E+07
cypermethrin	winterbarley	INSE	> 1E+03	2.97E+03	> 1E+06
chlorotoluron	winterbarley	HERB	> 1E+04	3.59E+02	> 1E+06
fenpropidin	winterwheat	FUNG	> 1E+04	1.43E+02	> 1E+06
deltamethrin	winterwheat	INSE	> 1E+04	1.81E+02	> 1E+06
methabenzthiazuron	winterbarley	HERB	> 1E+04	1.71E+02	> 1E+06
trifloxystrobine	winterwheat	FUNG	> 1E+04	2.42E+01	> 1E+06
chlorotoluron	winterwheat	HERB	> 1E+03	1.74E+02	> 1E+06
pro sulfocarb	winterbarley	HERB	> 1E+04	6.83E+01	> 1E+06
bifenox	winterwheat	HERB	> 1E+03	1.60E+02	> 1E+06
fenpropidin	winterbarley	FUNG	> 1E+03	2.95E+02	> 1E+06
lindane	winterwheat	INSE	3.61 E+03	6.30E+02	2.32 E+05
isoproturon	winterwheat	HERB	1.19 E+05	7.65E+00	9.09 E+05
fluvalinate	winterwheat	INSE	> 1E+04	6.95E+01	> 1E+05
lambda-cyhalothrin	winterwheat	INSE	> 1E+04	2.06E+01	> 1E+05

Table 40: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	winterbarley	INSE	> 1E+03	2.97E+03	> 1E+06
cypermethrin	winterwheat	INSE	> 1E+03	1.98E+03	> 1E+07
lindane	winterbarley	INSE	4.25 E+02	1.80E+03	2.59 E+05
bifenthrin	winterbarley	INSE	> 1E+01	9.00E+02	> 1E+04
lindane	winterwheat	INSE	3.61 E+03	6.30E+02	2.32 E+05
paraquat	winterbarley	HERB	> 1E+01	5.60E+02	> 1E+04
chlorotoluron	winterbarley	HERB	> 1E+04	3.59E+02	> 1E+06
parathion	winterbarley	INSE	1.80 E+02	3.57E+02	6.44 E+04
parathion	winterwheat	INSE	1.26 E+03	3.37E+02	4.26 E+05
fenpropidin	winterbarley	FUNG	> 1E+03	2.95E+02	> 1E+06
bifenthrin	winterwheat	INSE	> 1E+02	2.25E+02	> 1E+04
bifenox	winterbarley	HERB	> 1E+03	2.18E+02	> 1E+05
deltamethrin	winterbarley	INSE	> 1E+03	1.81E+02	> 1E+05
deltamethrin	winterwheat	INSE	> 1E+04	1.81E+02	> 1E+06
chlorotoluron	winterwheat	HERB	> 1E+03	1.74E+02	> 1E+06

9.5.2.4 Sugarbeet

110 application cases have a known RI-value. Again cypermethrin is found on top of the list with the highest RI's (Table 41). Also lindane heads both the lists, because of a small MTC-value (which results in a high RI) and a high sold amount in 2000 and 2001 (which gives a high frequency). In 2002 it was banned from the Belgian market.

Table 41: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
lindane	sugarbeet	INSE	1.03 E+04	1.16E+03	1.19 E+07
cypermethrin	sugarbeet	INSE	> 1E+03	3.98E+03	> 1E+06
diazinon	sugarbeet	INSE	> 1E+04	2.22E+02	> 1E+06
lenacil	sugarbeet	HERB	3.54 E+04	1.09E+02	3.87 E+06
metamitron	sugarbeet	HERB	9.84 E+04	2.63E+01	2.59 E+06
fenpropidin	sugarbeet	FUNG	> 1E+03	2.85E+02	> 1E+06
parathion	sugarbeet	INSE	3.64 E+03	4.85E+02	1.77 E+06
paraquat	chicory	HERB	> 1E+03	6.07E+02	> 1E+05
dimethenamid	sugarbeet	HERB	> 1E+04	2.08E+01	> 1E+05
paraquat	sugarbeet	HERB	> 1E+03	1.10E+02	> 1E+05
deltamethrin	sugarbeet	INSE	> 1E+03	1.52E+02	> 1E+05
tri-allate	sugarbeet	HERB	> 1E+03	4.14E+01	> 1E+05
difenoconazole	sugarbeet	FUNG	> 1E+04	6.61E+00	> 1E+05
mancozeb	sugarbeet	FUNG	4.71 E+03	4.07E+01	1.91 E+05
benfluralin	chicory	HERB	3.72 E+03	4.65E+01	1.73 E+05

Table 42: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	sugarbeet	INSE	> 1E+03	3.98E+03	> 1E+06
lindane	sugarbeet	INSE	1.03 E+04	1.16E+03	1.19 E+07
lindane	chicory	INSE	1.72 E+02	6.89E+02	1.19 E+05
paraquat	chicory	HERB	> 1E+03	6.07E+02	> 1E+05
parathion	sugarbeet	INSE	3.64 E+03	4.85E+02	1.77 E+06
fenpropidin	sugarbeet	FUNG	> 1E+03	2.85E+02	> 1E+06
parathion	chicory	INSE	6.89 E+01	2.82E+02	1.94 E+04
diazinon	sugarbeet	INSE	> 1E+04	2.22E+02	> 1E+06
endosulfan	sugarbeet	INSE	9.28 E+01	1.82E+02	1.69 E+04
fentin acetate	sugarbeet	FUNG	> 1E+02	1.71E+02	> 1E+04
deltamethrin	sugarbeet	INSE	> 1E+03	1.52E+02	> 1E+05
paraquat	sugarbeet	HERB	> 1E+03	1.10E+02	> 1E+05
lenacil	sugarbeet	HERB	3.54 E+04	1.09E+02	3.87 E+06
fluvalinate	sugarbeet	INSE	> 1E+02	8.95E+01	> 1E+04
heptenophos	sugarbeet	INSE	> 1E+02	8.52E+01	> 1E+04

9.5.2.5 Maize

71 application cases have a known RI-value. Lindane and dimethenamide are the numbers one and two in Table 43. This is due to the combination of a high RI and a high frequency for lindane, and mainly to very huge sales for dimethenamide in 2000, 2001 and 2002.

Table 43: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
lindane	maize	INSE	8.55 E+03	6.40E+02	5.47 E+06
dimethenamid	maize	HERB	> 1E+04	3.44E+01	> 1E+06
lindane	corn	INSE	1.66 E+03	8.67E+02	1.44 E+06
parathion	maize	INSE	1.11 E+03	5.10E+02	5.66 E+05
dimethenamid	corn	HERB	> 1E+04	3.34E+01	> 1E+05
diazinon	maize	INSE	> 1E+03	1.63E+02	> 1E+05
flufenacet	maize	HERB	> 1E+04	2.21E+01	> 1E+05
methiocarb	maize	INSE	> 1E+04	1.35E+01	> 1E+05
atrazine	maize	HERB	1.58 E+05	2.05E+00	3.25 E+05
carbosulfan	maize	INSE	> 1E+02	1.08E+03	> 1E+05
paraquat	maize	HERB	> 1E+03	8.18E+01	> 1E+04
sulcotrione	maize	HERB	> 1E+05	4.77E-01	> 1E+04
pendimethalin	maize	HERB	> 1E+03	6.21E+00	> 1E+04
mancozeb	maize	FUNG	8.59 E+02	6.73E+01	5.78 E+04
atrazine	corn	HERB	3.10 E+04	1.75E+00	5.42 E+04

Table 44: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
carbosulfan	maize	INSE	> 1E+02	1.08E+03	> 1E+05
lindane	corn	INSE	1.66 E+03	8.67E+02	1.44 E+06
lindane	maize	INSE	8.55 E+03	6.40E+02	5.47 E+06
parathion	maize	INSE	1.11 E+03	5.10E+02	5.66 E+05
diazinon	maize	INSE	> 1E+03	1.63E+02	> 1E+05
mancozeb	corn	FUNG	1.56 E+02	1.01E+02	1.57 E+04
paraquat	maize	HERB	> 1E+03	8.18E+01	> 1E+04
mancozeb	maize	FUNG	8.59 E+02	6.73E+01	5.78 E+04
dimethenamid	maize	HERB	> 1E+04	3.44E+01	> 1E+06
dimethenamid	corn	HERB	> 1E+04	3.34E+01	> 1E+05
trifloxystrobine	maize	FUNG	> 1E+03	2.80E+01	> 1E+04
phoxim	corn	INSE	> 1E+01	2.79E+01	> 1E+03
flufenacet	corn	HERB	> 1E+03	2.21E+01	> 1E+04
flufenacet	maize	HERB	> 1E+04	2.21E+01	> 1E+05
lambda-cyhalothrin	maize	INSE	> 1E+02	2.07E+01	> 1E+04

9.5.2.6 Fodder

58 application cases have a known RI-value. Cypermethrin, parathion and lindane head the lists. Those 3 active substances are frequently repeated throughout the crops in the lists with highest RI's and RI*F's. Parathion and lindane are already banned in Belgium, cypermethrin is still allowed.

In Table 45 many herbicides appear in the top 15 (8), due to the fact that there are few insecticides applied on grassland (only 7 of the 58 active substances used). The other 51 application cases are all herbicides, which have a lower risk for water organisms than insecticides have.

Table 45: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
parathion	permanent grassland	INSE	3.00 E+03	5.85E+02	1.75 E+06
lindane	permanent grassland	INSE	2.46 E+03	3.42E+02	8.40 E+05
diazinon	permanent grassland	INSE	> 1E+03	1.54E+02	> 1E+05
paraquat	permanent grassland	HERB	> 1E+03	7.51E+01	> 1E+05
cypermethrin	permanent grassland	INSE	> 1E+01	1.70E+03	> 1E+05
chlorpyrifos	permanent grassland	INSE	> 1E+03	2.88E+01	> 1E+05
trichlorfon	permanent grassland	INSE	> 1E+03	4.95E+01	> 1E+04
mcpb	permanent grassland	HERB	> 1E+04	1.20E+00	> 1E+04
bifenox	permanent grassland	HERB	> 1E+02	5.21E+01	> 1E+04
permethrin	permanent grassland	INSE	> 1E+02	4.97E+01	> 1E+04
mcpb	ley	HERB	> 1E+03	2.15E+00	> 1E+03
prosulfoarb	permanent grassland	HERB	> 1E+02	2.89E+00	> 1E+03
isoproturon	permanent grassland	HERB	5.38 E+02	3.19E+00	1.72 E+03
atrazine	permanent grassland	HERB	2.01 E+03	3.03E-01	6.09 E+02
ethofumesate	ley	HERB	> 1E+03	1.97E-01	> 1E+02

Table 46: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	permanent grassland	INSE	> 1E+01	1.70E+03	> 1E+05
parathion	permanent grassland	INSE	3.00 E+03	5.85E+02	1.75 E+06
lindane	permanent grassland	INSE	2.46 E+03	3.42E+02	8.40 E+05
diazinon	permanent grassland	INSE	> 1E+03	1.54E+02	> 1E+05
paraquat	permanent grassland	HERB	> 1E+03	7.51E+01	> 1E+05
bifenox	permanent grassland	HERB	> 1E+02	5.21E+01	> 1E+04
permethrin	permanent grassland	INSE	> 1E+02	4.97E+01	> 1E+04
trichlorfon	permanent grassland	INSE	> 1E+03	4.95E+01	> 1E+04
chlorpyrifos	permanent grassland	INSE	> 1E+03	2.88E+01	> 1E+05
isoproturon	permanent grassland	HERB	5.38 E+02	3.19E+00	1.72 E+03
prosulfoarb	permanent grassland	HERB	> 1E+02	2.89E+00	> 1E+03
mcpb	ley	HERB	> 1E+03	2.15E+00	> 1E+03
mcpb	permanent grassland	HERB	> 1E+04	1.20E+00	> 1E+04
trifluralin	permanent grassland	HERB	> 1E+02	1.06E+00	> 1E+02
simazine	permanent grassland	HERB	> 1E+02	3.62E-01	> 1E+02

9.5.2.7 Vegetables

120 application cases have a known RI-value. Besides the usual insecticides, fungicides and herbicides, also a soil disinfectant is mentioned in Table 47. The risk index RI of metam-natrium is not so high (absent in Table 48), but due to very high sales the total PRIBEL value RI*F is rather high.

Table 47: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
deltamethrin	carrot	INSE	> 1E+03	2.13E+03	> 1E+06
aclonifen	pea without pod	HERB	> 1E+03	3.82E+02	> 1E+06
parathion	leek	INSE	1.44 E+03	2.00E+03	2.88 E+06
heptenophos	carrot	INSE	> 1E+03	1.39E+03	> 1E+06
furathiocarb	leek	INSE	> 1E+03	4.99E+02	> 1E+06
endosulfan	leek	INSE	5.78 E+02	1.50E+03	8.67 E+05
lambda-cyhalothrin	bean without pod	INSE	> 1E+03	1.17E+02	> 1E+05
metam-natrium	leek	SODE	> 1E+04	2.70E+01	> 1E+05
fluvalinate	pea without pod	INSE	> 1E+03	8.04E+01	> 1E+05
deltamethrin	bean without pod	INSE	> 1E+03	1.06E+02	> 1E+05
mancozeb	pea without pod	FUNG	1.61 E+04	3.11E+01	5.01 E+05
mancozeb	leek	FUNG	1.04 E+04	4.39E+01	4.56 E+05
thiram	bean without pod	FUNG	> 1E+03	8.51E+01	> 1E+05
methiocarb	leek	INSE	> 1E+03	6.81E+01	> 1E+05
lambda-cyhalothrin	pea without pod	INSE	> 1E+04	2.07E+01	> 1E+05

Table 48: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
deltamethrin	carrot	INSE	> 1E+03	2.13E+03	> 1E+06
parathion	leek	INSE	1.44 E+03	2.00E+03	2.88 E+06
endosulfan	leek	INSE	5.78 E+02	1.50E+03	8.67 E+05
heptenophos	carrot	INSE	> 1E+03	1.39E+03	> 1E+06
permethrin	leek	INSE	> 1E+02	1.29E+03	> 1E+05
furathiocarb	leek	INSE	> 1E+03	4.99E+02	> 1E+06
aclonifen	pea without pod	HERB	> 1E+03	3.82E+02	> 1E+06
deltamethrin	leek	INSE	> 1E+02	2.76E+02	> 1E+05
paraquat	leek	HERB	> 1E+02	2.00E+02	> 1E+04
dimethenamid	leek	HERB	> 1E+01	1.47E+02	> 1E+03
omethoate	leek	INSE	> 1E+02	1.42E+02	> 1E+04
fentin acetate	leek	FUNG	> 1E+01	1.42E+02	> 1E+03
lenacil	spinach	HERB	1.37 E+03	1.40E+02	1.91 E+05
tri-allate	spinach	HERB	> 1E+03	1.32E+02	> 1E+05
lambda-cyhalothrin	spinach	INSE	> 1E+03	1.24E+02	> 1E+05

9.5.2.8 Industrial crops

19 application cases have a known RI-value. This is a very small part, which leads to active substances with small RI's and RI*F's that are implemented in Table 49 and 50. Only bifenthrin has a high RI (4.52 E+03); the other active substances applied in flax and canola will not contribute highly to the total risk over all the crops.

Table 49: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
bifenthrin	flax	INSE	> 1E+03	4.52E+03	> 1E+06
lenacil	flax	HERB	1.10 E+04	9.77E+01	1.08 E+06
lambda-cyhalothrin	flax	INSE	> 1E+04	2.07E+01	> 1E+05
lambda-cyhalothrin	canola	INSE	> 1E+03	3.25E+01	> 1E+05
methiocarb	canola	INSE	> 1E+03	2.08E+01	> 1E+04
carbetamide	canola	HERB	> 1E+03	8.98E+00	> 1E+04
bromoxynil	flax	HERB	> 1E+03	2.64E+00	> 1E+04
carbendazim	canola	FUNG	> 1E+03	3.54E+00	> 1E+04
linuron	flax	HERB	> 1E+04	6.09E-01	> 1E+03
metazachlor	canola	HERB	> 1E+03	1.14E+00	> 1E+03
fluazifop-p butyl ester	canola	HERB	> 1E+03	6.07E-01	> 1E+03
clomazone	canola	HERB	> 1E+03	7.07E-02	> 1E+02
flupyr-sulfuron-methyl-sodium	flax	HERB	> 1E+03	5.04E-02	> 1E+02
metaldehyde	canola	INSE	> 1E+03	1.01E-02	> 1E+01
iprodione	canola	FUNG	> 1E+03	7.28E-03	> 1E+01

Table 50: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
bifenthrin	flax	INSE	> 1E+03	4.52E+03	> 1E+06
lenacil	flax	HERB	1.10 E+04	9.77E+01	1.08 E+06
lambda-cyhalothrin	canola	INSE	> 1E+03	3.25E+01	> 1E+05
methiocarb	canola	INSE	> 1E+03	2.08E+01	> 1E+04
lambda-cyhalothrin	flax	INSE	> 1E+04	2.07E+01	> 1E+05
carbetamide	canola	HERB	> 1E+03	8.98E+00	> 1E+04
carbendazim	canola	FUNG	> 1E+03	3.54E+00	> 1E+04
bromoxynil	flax	HERB	> 1E+03	2.64E+00	> 1E+04
metazachlor	canola	HERB	> 1E+03	1.14E+00	> 1E+03
linuron	flax	HERB	> 1E+04	6.09E-01	> 1E+03
fluazifop-p butyl ester	canola	HERB	> 1E+03	6.07E-01	> 1E+03
clomazone	canola	HERB	> 1E+03	7.07E-02	> 1E+02
flupyr-sulfuron-methyl-sodium	flax	HERB	> 1E+03	5.04E-02	> 1E+02
metaldehyde	canola	INSE	> 1E+03	1.01E-02	> 1E+01
iprodione	canola	FUNG	> 1E+03	7.28E-03	> 1E+01

9.5.2.9 Greenhouse crops

88 application cases have a known RI-value. In Table 51 three soil disinfectants are listed: methyl bromide, 1,3-dichloropropene and sulfotep. The sales of sulfotep are negligible, those of methyl bromide and 1,3-dichloropropene on the other hand are high. The applied dose per hectare is extremely high for the afore-mentioned soil disinfectants (441 kg/ha and 312 kg/ha respectively). But due to a relatively high MTC-value the soil disinfectants are not on top of the lists below. The insecticide dichlorvos tops Table 51 and is number two in Table 52 due to a very low MTC-value.

Table 51: Overview of the application cases that have the highest contribution to the total risk RI*F

AS name	crop	pesticide group	frequency	RI	RI*F
dichlorvos	greenhouse vegetables	INSE	> 1E+01	5.77E+00	> 1E+02
thiram	greenhouse vegetables	FUNG	> 1E+04	4.96E-02	> 1E+02
cypermethrin	greenhouse vegetables	INSE	> 1E+01	8.22E+00	> 1E+02
deltamethrin	greenhouse vegetables	INSE	> 1E+02	5.54E-01	> 1E+02
pyridaben	greenhouse vegetables	INSE	> 1E+02	9.49E-01	> 1E+02
heptenophos	greenhouse vegetables	INSE	> 1E+02	7.04E-01	> 1E+02
methyl bromide	greenhouse vegetables	SODE	> 1E+02	8.95E-01	> 1E+02
paraquat	greenhouse vegetables	HERB	> 1E+02	5.99E-01	> 1E+02
1,3-dichloropropene	greenhouse vegetables	SODE	> 1E+03	1.01E-01	> 1E+02
sulfotep	greenhouse vegetables	SODE	> 1E+01	3.51E+00	> 1E+01
parathion	greenhouse vegetables	INSE	6.83 E+01	6.11E-01	4.17 E+01
permethrin	greenhouse vegetables	INSE	> 1E+01	3.98E-01	> 1E+01
fenbutatin oxide	greenhouse vegetables	INSE	> 1E+02	8.11E-02	> 1E+01
abamectin	greenhouse vegetables	INSE	> 1E+02	1.10E-01	> 1E+01
pirimiphos-methyl	greenhouse vegetables	INSE	> 1E+01	1.18E+00	> 1E+01

Table 52: Overview of the application cases that have the highest risk indices RI

AS name	crop	pesticide group	frequency	RI	RI*F
cypermethrin	greenhouse vegetables	INSE	> 1E+01	8.22E+00	> 1E+02
dichlorvos	greenhouse vegetables	INSE	> 1E+01	5.77E+00	> 1E+02
sulfotep	greenhouse vegetables	SODE	> 1E+01	3.51E+00	> 1E+01
pirimiphos-methyl	greenhouse vegetables	INSE	> 1E+01	1.18E+00	> 1E+01
pyridaben	greenhouse vegetables	INSE	> 1E+02	9.49E-01	> 1E+02
methyl bromide	greenhouse vegetables	SODE	> 1E+02	8.95E-01	> 1E+02
bifenthrin	greenhouse vegetables	INSE	> 1E+01	7.23E-01	> 1E+01
heptenophos	greenhouse vegetables	INSE	> 1E+02	7.04E-01	> 1E+02
parathion	greenhouse vegetables	INSE	6.83 E+01	6.11E-01	4.17 E+01
paraquat	greenhouse vegetables	HERB	> 1E+02	5.99E-01	> 1E+02
deltamethrin	greenhouse vegetables	INSE	> 1E+02	5.54E-01	> 1E+02
furathiocarb	greenhouse vegetables	INSE	> 1E+01	4.77E-01	> 1E+00
permethrin	greenhouse vegetables	INSE	> 1E+01	3.98E-01	> 1E+01
endosulfan	greenhouse vegetables	INSE	1.02 E+01	3.05E-01	3.10 E+00
fentin acetate	greenhouse vegetables	FUNG	> 1E+00	2.36E-01	> 1E+00

10 Conclusions and perspectives

Conclusions

Pribel is a tool that allows estimating the entire risk generated by the use of pesticides in agriculture towards 7 compartments (applicators, consumers, water organisms, ground water, earthworms, birds and bees) at the Belgian level and per year. The figures given by Pribel can be cut (or aggregated) in 9 crop groups (potato, orchard, cereal, sugarbeet, maize, fodder, vegetables, industrial crops and greenhouse crops) or in 5 pesticide groups (insecticides, fungicides, herbicides, soil disinfectants and non plant protection products).

The main purpose of the development of a risk indicator for Belgium is to observe the evolution of the global risk caused by pesticides in agriculture for Belgium over the years. Now that the principles and the software of Pribel are well developed and thoroughly founded, the calculations can be repeated easily every year.

Pribel is based on official toxicological datasets, on surveys about pesticide sales and on application doses. The sales and the application doses allow to calculate the frequency F of application of the active substances on each crop in Belgium. The toxicological data allow to calculate, via the Pribel algorithms, the risk indexes RI for the application cases of the database.

Pribel multiplies the risk index of each application by the frequency of the application. Thereafter, the sum of these multiplications $\text{sum}(RI \times F)$ gives an estimation, on one year, for the total risk for Belgium, for a crop group or for a pesticide group.

Pribel has an original and new approach of the risks linked to pesticides because it balances each individual risk of pesticide use by the number of events of this risk. Up to now, only individual risks (on 1 ha, at 1 application) were considered without taking the frequency into account.

Pribel delivers various informations:

With the Pribel figures, it is possible to compare the risk of different groups towards one compartment or to evaluate the evolution in time of the risk due to one group.

Inside one Pribel figure, i.e. inside one group and towards one compartment, it is possible to find which application cases contribute the most to the results. Hence, there can be determined which active substances on which crop are the riskiest ones because of all their applications in Belgium. It is also possible to find the riskiest application cases at one single application. The cause of a high total risk of one application case can then be attributed to its high frequency and/or to its high risk index. These nuances constitute the main innovations of Pribel.

One of the limits of Pribel is that it is based on toxicological datas established in laboratories to evaluate the risks on the field. The laboratory conditions do not take into account the infinite variability in the application and environmental conditions encountered on the field. Nevertheless, the calculation of the risk indexes by algorithms try to draw near to the real risk by integrating several variable parameters simulating the influence of the field conditions (e.g. type of soil, protection of the applicator, flowering period,...).

Pribel must not be considered as the exact truth but it must be used to obtain a description of the general tendencies in Belgium, in particular in the choice of pesticide reduction measures. Pribel considers “worst case” situations (e.g.: type of soil “sand”, no applicator protection), hence the figures represent what happens in the worst conditions.

In the same way, the risk indices are based on a first tier approach, i.e. worst case for exposure is taken into consideration. This means that when the risk is considered to be acceptable in a first tier approach, it is expected to be always true in real application conditions. In contrast, when a risk is considered to be excessive with a first tier approach, this means that there has to be verified whether or not this occurs in real application conditions. The expert system used in Pribel by-passes the risk determination for some common application conditions for which the risk is considered to be negligible (e.g. risks of surface water contamination with seed treatments). A first tier approach with indicators can be used to identify which products and applications might be avoided to minimize the impact of pesticides on human health and environment.

Perspectives

The differences between the Pribel values of different years as well as the analysis of uncertainty of the Pribel values will be explained more in detail in further works.

The project “Follow-up of the Federal Pesticide Reduction Plan using Pribel” is an extension of this project and has to aim to preserve the expertise on the calculations of Risk Index values using PRIBEL and to provide assistance to the working groups installed in the framework of the Federal Pesticide Reduction Plan by giving practical information on distribution of the Risk Index values calculated with PRIBEL taking into account:

- the main crop groups such as cereals, potatoes, orchards, maize, sugarbeets, industrial crops (rapeseed, flax, ...), vegetables (outdoors), fodder (pasture, raygrass,) and greenhouse crops;
- the main statistical parameters gathered (mean, median, percentiles, etc);
- the list of relevant pesticides (such as those belonging to group with the highest RI values);
- the comparisons between years (1991, 1996 and 2003 as far as use data are available and reliable);
- the comparisons between pesticide groups (mainly insecticides, fungicides and herbicides);
- the comparisons between the 7 compartments considered by Pribel (applicators, consumers, aquatic organisms, groundwater, earthworms, birds and bees

Specialists should be entrusted with the communication of the Pribel results. The interpretation and the comprehension of some graphs is indeed not always easy.

The Pribel system has just been builded up and it has thus some youth imperfections. There are still elements (little errors, lack of data) that can be improved in the database which is constituted from a great number of informations. These imperfections are rectified gradually so the system will improve in an iterative way.

The encoding of new toxicological values will decrease the uncertainty due to the application cases with an unknown risk index. It would also be desirable to break the confidentiality of some toxicological values to be able to use them in the database. It is expected that in 2008 no more confidentiality will exist concerning toxicological data.

The algorithms used for the calculation of the risk indexes can still be refined to be more realistic. Future improvements coming from scientific research must be integrated in the formulas on a regular base.

Sales data for other years than 2000, 2001 and 2002, until 2010 must be collected to be able to evaluate the situation of the next years and the evolution of trends in the frame of the federal Pesticide Reduction Plan. New inquiries should be framed and it should be necessary to build up, in collaboration with the industry, a collecting system for the sales data of all the active substances in agriculture.

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ANNEX I: Average doses applied in Belgium for every pesticide used in each crop considered in Pribel, and the dose for one application in the case of multi-applications (both expressed in kg/ha)

Potatoes

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,306	0,306
aclonifen	herb	1,092	1,092
benalaxyl	fung	0,266	0,26
bentazon	herb	0,150	0,15
carbendazim	fung	0,195	0,195
carbofuran	inse	0,186	0,186
carfentrazone	herb	0,073	0,073
chlorothalonil	fung	1,022	1,022
chlorpropham	nppp	0,662	0,662
chlorpyrifos	inse	0,572	0,572
chlorpyrifos-methyl	inse	0,233	0,233
clethodim	herb	0,118	0,118
clomazone	herb	0,079	0,079
copper oxychloride	fung	0,329	0,329
cycloxydim	herb	0,014	0,014
cyfluthrin	inse	0,003	0,003
cymoxanil	fung	0,202	0,1
cypermethrin	inse	0,024	0,025
cypermethrin	inse	0,025	0,025
deltamethrin	inse	0,012	0,012
diazinon	inse	0,374	0,374
difenoconazole	fung	0,117	0,117
dimethoate	inse	0,341	0,17
dimethomorph	fung	0,415	0,15
diquat	herb	0,625	0,625
diquat	herb	0,691	0,691
dnoc	inse	0,420	0,42
endosulfan	inse	0,387	0,193
esfenvalerate	inse	0,021	0,021
estered coleseed oil	nppp	0,588	0,588
ethiofencarb	inse	0,428	0,428
ethoprop	inse	1,442	1,442
fenitrothion	inse	0,006	0,006
fenpiclonil	fung	0,030	0,03
fenpropidin	fung	0,575	0,575
fenpropimorph	fung	2,289	2,289
fentin acetate	fung	0,560	0,28
fentin hydroxyde	fung	0,965	0,321
fluazifop-p butyl ester	herb	0,035	0,035
fluazinam	fung	0,972	0,162
flufenacet	herb	0,478	0,478
fluorochloridone	herb	0,108	0,108
flutolanil	fung	0,099	0,099
fluvalinate	inse	0,026	0,026

glufosinate ammonium salt (1:1)	herb	0,255	0,255
glyphosate	herb	0,533	0,533
heptenophos	inse	0,194	0,194
hexaconazole	fung	2,269	2,269
hydroxyquinoline sulfate	fung	0,593	0,593
imidacloprid	inse	0,067	0,067
isodecyl alcohol ethoxylate	nppp	0,104	0,104
lambda-cyhalothrin	inse	0,007	0,007
lindane	inse	0,870	0,870
linuron	herb	0,456	0,456
mancozeb	fung	12,635	1,263
maneb	fung	9,968	1,661
mcpa	herb	0,462	0,462
mcpb	herb	0,017	0,017
mepronil	fung	0,229	0,229
metalaxyl	fung	0,189	0,189
metalaxyl-m	fung	0,096	0,096
metazachlor	herb	0,221	0,221
metiram	fung	2,267	1,13
metobromuron	herb	0,713	0,713
metoxuron	herb	0,766	0,766
metribuzin	herb	0,330	0,33
mineral oil	nppp	0,626	0,626
mineral oil	nppp	0,152	0,152
monolinuron	herb	0,241	0,241
nonyl phenol polyglycoether	nppp	0,115	0,115
nonylphenol polyethylene glycol ether	nppp	0,427	0,427
ofurace	fung	0,059	0,059
omethoate	inse	0,277	0,277
oxadixyl	fung	0,170	0,17
oxamyl	sode	0,847	0,847
oxydemeton methyl	inse	0,263	0,263
paraquat	herb	0,162	0,162
parathion	inse	0,287	0,287
pencycuron	fung	0,235	0,235
pendimethalin	herb	0,576	0,576
pirimicarb	inse	0,127	0,127
propamocarb	fung	1,171	0,58
propaquizafop	herb	0,010	0,01
propineb	fung	2,154	1,07
propoxur	inse	0,300	0,300
prosofocarb	herb	2,728	2,728
quizalofop-p-ethyl	herb	0,008	0,008
rapeseed oil	nppp	2,583	2,583
rimsulfuron	herb	0,006	0,006
sethoxydim	herb	0,037	0,037
sulphur	fung	0,858	0,858
tetraconazole	fung	0,123	0,123
thiometon	inse	0,113	0,113
thiophanate-methyl	fung	0,142	0,142
ziram	fung	0,800	0,8

Apple

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
1-naphthylacetic acid	nppp	0,011	0,011
2,4-d	herb	0,251	0,251
6-benzyladenine	nppp	0,006	0,006
abamectin	inse	0,001	0,001
amitraz	inse	0,246	0,246
amitrol(-t)	herb	0,716	0,716
amitrole	herb	0,842	0,842
atrazine	herb	0,686	0,686
azaconazole	fung	0,015	0,015
azocyclotin	inse	0,296	0,296
bitertanol	fung	0,031	0,031
bromopropylate	inse	0,471	0,471
bromoxynil	herb	0,078	0,078
captan	fung	10,724	1,191
carbaryl	inse	0,258	0,258
carbendazim	fung	0,809	0,404
chlormequat	nppp	2,801	2,801
chlorotoluron	herb	0,553	0,553
chlorpyrifos	inse	0,394	0,394
clofentezin	inse	0,371	0,371
clopyralid	herb	0,004	0,004
copper hydroxyde	fung	2,425	1,212
copper oxychloride	fung	3,031	1,515
cyfluthrin	inse	0,022	0,011
cypermethrin	inse	0,088	0,022
cypermethrin	inse	0,023	0,023
cyprodinil	fung	0,233	0,116
deltamethrin	inse	0,021	0,01
diazinon	inse	0,004	0,004
dicamba	herb	0,052	0,052
dichlobenil	herb	0,209	0,209
dichlorprop	herb	0,497	0,497
dichlorprop-p	herb	0,677	0,677
dicofol, p,p	inse	0,161	0,161
diethofencarb	fung	0,215	0,215
difenoconazole	fung	0,089	0,022
diflubenzuron	inse	0,081	0,081
diflufenican	herb	0,032	0,032
dimethoate	inse	0,827	0,413
diquat	herb	0,113	0,113
dithianon	fung	1,439	0,479
diuron	herb	0,818	0,818
dnoc	inse	0,927	0,927
dodine	fung	1,310	0,436
endosulfan	inse	0,717	0,717
ethephon	nppp	0,177	0,177
ethiofencarb	inse	0,878	0,878

ethoxylated fatty amines	nppp	0,476	0,476
fenazaquin	inse	0,146	0,146
fenbutatin oxide	inse	0,114	0,114
fenoxycarbe	inse	0,078	0,078
fenpropathrin	inse	0,230	0,230
fenpyroximate	inse	0,023	0,023
fluazifop-p butyl ester	herb	0,023	0,023
flucycloxuron	inse	0,156	0,156
flufenoxuron	inse	0,051	0,051
fluroxypyr	herb	0,005	0,005
flusilazole	fung	0,082	0,082
gibberellic acid	nppp	0,006	0,006
gibberellic acids a4+7	nppp	0,008	0,008
glufosinate ammonium salt (1:1)	herb	0,191	0,191
glyphosate	herb	0,965	0,965
haloxyfop ethoxyethyl ester	herb	0,010	0,01
hexaconazole	fung	0,089	0,022
hexythiazox	inse	0,023	0,023
imazalil	fung	0,029	0,029
imidacloprid	inse	0,075	0,075
ioxynil	herb	0,099	0,099
iprodione	fung	2,095	2,095
isoproturon	herb	0,330	0,33
isoxaben	herb	0,188	0,188
kresoxim-methyl	fung	0,260	0,065
lenacil	herb	0,104	0,104
linuron	herb	0,425	0,425
mancozeb	fung	2,666	1,333
maneb	fung	3,435	1,145
mcpa	herb	0,329	0,329
mcpb	herb	0,398	0,398
mecoprop	herb	0,243	0,243
mecoprop-p	herb	0,261	0,261
metasystox thiol	inse	0,037	0,037
metazachlor	herb	0,672	0,672
methidathion	inse	0,601	0,601
methiocarb	inse	0,144	0,144
metiram	fung	1,521	0,76
mineral oil	inse	3,740	3,740
mineral oil	nppp	0,552	0,552
mineral oil	nppp	8,449	8,449
myclobutanil	fung	0,335	0,335
naphthaleneacetamide	nppp	0,023	0,023
napropamide	herb	0,047	0,047
nitrothal isopropyl	fung	0,808	0,269
nonyl phenol polyglycoether	nppp	0,354	0,354
nonylphenol-decaethyleenglycol	nppp	0,062	0,062
nonylphenol polyethylene glycol ether	nppp	0,654	0,654
nuarimol	fung	0,089	0,089
oxydemeton methyl	inse	0,072	0,072
paraquat	herb	0,208	0,208
parathion	inse	0,226	0,226
penconazole	fung	0,059	0,014
phenmedipham	herb	0,050	0,05

phosalone	inse	0,534	0,534
pirimicarb	inse	0,286	0,286
prochloraz	fung	0,101	0,101
propoxur	inse	0,401	0,401
pyridaben	inse	0,060	0,06
pyridate	herb	0,234	0,234
pyrifenox	fung	0,138	0,138
pyrimethanil	fung	0,461	0,23
simazine	herb	0,420	0,42
sulphur	fung	8,862	2,954
tebufenozide	inse	0,153	0,153
tebufenpyrad	inse	0,085	0,085
tetraconazole	fung	0,082	0,082
thiometon	inse	0,194	0,194
thiophanate-methyl	fung	0,647	0,323
thiram	fung	6,398	1,279
tolyfluanid	fung	1,780	0,593
triadimefon	fung	0,084	0,084
triadimenol	fung	0,052	0,026
triclopyr	herb	0,014	0,014
vamidothion	inse	0,271	0,271
vinclozolin	fung	0,205	0,205
ziram	fung	0,206	0,206

Pear

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
1-naphthylacetic acid	nppp	0,033	0,033
2,4-d	herb	0,146	0,146
6-benzyladenine	nppp	0,008	0,008
amitraz	inse	0,843	0,843
amitrol(-t)	herb	1,242	1,242
atrazine	herb	0,065	0,065
azocyclotin	inse	0,382	0,382
bromopropylate	inse	0,326	0,326
captan	fung	5,776	0,962
carbaryl	inse	0,660	0,66
carbendazim	fung	0,412	0,206
carbetamide	herb	0,105	0,105
chlormequat	nppp	0,529	0,529
chlorothalonil	fung	0,425	0,425
chlorotoluron	herb	0,817	0,817
chlorpyrifos	inse	0,563	0,563
copper hydroxyde	fung	2,059	2,059
copper oxychloride	fung	3,106	1,553
cyfluthrin	inse	0,029	0,014
cyromazin	inse	0,065	0,065
deltamethrin	inse	0,012	0,006
diazinon	inse	0,136	0,136
dicamba	herb	0,042	0,042
dichlobenil	herb	0,047	0,047

dichloorprop(-p)	herb	0,446	0,446
diethofencarb	fung	0,255	0,255
difenoconazole	fung	0,112	0,028
diflubenzuron	inse	0,115	0,115
diflufenican	herb	0,084	0,084
diquat	herb	0,107	0,107
dithianon	fung	0,834	0,417
diuron	herb	0,733	0,733
dnoc	inse	2,685	2,685
dodine	fung	1,363	0,454
endosulfan	inse	0,956	0,956
ethephon	nppp	0,065	0,065
ethiofencarb	inse	0,077	0,077
fenarimol	fung	0,025	0,025
fenazaquin	inse	0,201	0,201
fenbutatin oxide	inse	0,252	0,252
fenoxycarbe	inse	0,154	0,154
flufenoxuron	inse	0,065	0,065
gamma aminobutyric acid	nppp	0,000	0,000
gibberellic acid	nppp	0,206	0,206
gibberellic acids a4+7	nppp	0,008	0,008
glufosinate ammonium salt (1:1)	herb	0,251	0,251
glyphosate	herb	0,988	0,988
hexaconazole	fung	0,011	0,011
hexythiazox	inse	0,020	0,02
imidacloprid	inse	0,025	0,025
iron sulfate	herb	0,035	0,035
isodecyl alcohol ethoxylate	nppp	0,097	0,097
isoxaben	herb	0,045	0,045
kresoxim-methyl	fung	0,402	0,402
linuron	herb	0,588	0,588
mancozeb	fung	4,071	1,357
maneb	fung	4,040	1,346
mcpa	herb	0,307	0,307
mcpb	herb	0,828	0,828
mecoprop(-p)	herb	0,262	0,262
metazachlor	herb	0,100	0,100
methidathion	inse	0,136	0,136
methiocarb	inse	0,017	0,017
metiram	fung	3,027	1,51
mineral oil	nppp	6,057	6,057
mineral oil	nppp	18,559	18,559
monolinuron	herb	0,418	0,418
myclobutanil	fung	0,089	0,09
nitrothal isopropyl	fung	0,511	0,511
nonyl phenol polyglycoether	nppp	0,254	0,254
nonylphenol-decaethyleenglycol	nppp	0,045	0,045
nonylphenol polyethylene glycol ether	nppp	0,545	0,545
omethoate	inse	4,673	4,673
oxadiazon	herb	0,140	0,140
paraquat	herb	0,181	0,181
penconazole	fung	0,019	0,019
phosalone	inse	0,566	0,566
pirimicarb	inse	0,041	0,041

propoxur	inse	0,401	0,401
pyridaben	inse	0,039	0,039
pyrimethanil	fung	0,371	0,185
simazine	herb	0,610	0,610
streptomycin	nppp	0,072	0,072
sulphur	fung	4,922	2,461
tebufenozide	inse	0,179	0,179
tebufenpyrad	inse	0,047	0,047
thiophanate-methyl	fung	0,959	0,48
thiram	fung	10,174	1,271
tolyfluanid	fung	2,726	0,681
triadimefon	nppp	0,039	0,039
triadimenol	fung	0,132	0,033
trifloxystrobine	fung	0,203	0,05
vamidothion	inse	0,253	0,253

Nursery

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
carbetamide	herb	0,180	0,180
dichlobenil	herb	0,224	0,224
diuron	herb	0,150	0,150
glyphosate	herb	0,180	0,180
isoxaben	herb	0,090	0,090
metazachlor	herb	0,350	0,350
pronamide	herb	0,160	0,160
simazine	herb	0,200	0,200

Barley

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,174	0,174
amidosulfuron	herb	0,008	0,008
azoxystrobine-isomer	fung	0,224	0,224
bentazon	herb	0,720	0,72
bifenox	herb	0,282	0,282
bifenthrin	inse	0,040	0,04
bromoxynil	herb	0,224	0,224
bromuconazole	fung	0,277	0,277
carbendazim	fung	0,091	0,091
carfentrazone	herb	0,203	0,203
chlormequat	nppp	0,608	0,608
chlorothalonil	fung	0,737	0,737
chlorotoluron	herb	1,452	1,452
clopyralid	herb	0,052	0,052
copper oxychloride	fung	1,000	1
cyfluthrin	inse	0,014	0,014

cypermethrin	inse	0,015	0,015
cypermethrin	inse	0,036	0,018
cyproconazole	fung	0,061	0,061
cyprodinil	fung	0,524	0,524
deltamethrin	inse	0,006	0,006
dichlorprop	herb	0,364	0,364
dichlorprop-p	herb	0,561	0,561
difenoconazole	fung	0,028	0,028
diflufenican	herb	0,093	0,093
diquat	herb	0,311	0,311
epoxyconazole	fung	0,121	0,121
ethephon	nppp	0,498	0,498
fenoxaprop-p-ethyl+fenchlorazol-ethyl	herb	0,022	0,022
fenoxaprop-p-ethyl+mefenpyr-diethyl	herb	0,022	0,022
fenpropidin	fung	0,298	0,298
fenpropimorph	fung	0,332	0,332
fludioxonil	fung	0,019	0,019
fluoroglycofen ethyl	herb	0,158	0,158
flupyrsulfuron-methyl-sodium	herb	0,011	0,01
fluquinconazole	fung	0,081	0,081
fluroxypyr	herb	0,155	0,155
flusilazole	fung	0,174	0,174
fluvalinate	inse	0,018	0,018
glyphosate	herb	0,657	0,657
glyphosate-trimethylsulfonium	herb	0,263	0,263
imazamethabenz methyl ester	herb	0,273	0,273
imazaquin	nppp	0,001	0,001
ioxynil	herb	0,175	0,175
iprodione	fung	0,527	0,527
isoproturon	herb	1,035	1,035
isoxaben	herb	0,081	0,081
kresoxim-methyl	fung	0,108	0,108
lambda-cyhalothrin	inse	0,006	0,006
lindane	inse	1,457	1,457
linuron	herb	0,246	0,246
mcpa	herb	0,527	0,527
mcpb	herb	1,161	1,161
mecoprop	herb	0,625	0,625
mecoprop-p	herb	0,366	0,366
mepiquat chloride	nppp	0,177	0,177
metconazole	fung	0,091	0,091
methiocarb	inse	0,099	0,099
metsulfuron methyl ester	herb	0,003	0,003
paraquat	herb	0,520	0,520
parathion	inse	0,116	0,116
pendimethalin	herb	0,810	0,81
pirimicarb	inse	0,136	0,136
prochloraz	fung	0,365	0,365
propiconazole	fung	0,137	0,137
prosulfocarb	herb	3,037	3,037
spiroxamine	fung	0,377	0,377
sulphur	fung	4,069	4,069
tebuconazole	fung	0,319	0,319
tetraconazole	fung	0,028	0,028

thifensulfuron methyl ester	herb	0,006	0,006
thiometon	inse	0,046	0,046
triadimenol	fung	0,125	0,125
triasulfuron	herb	0,020	0,020
triazoxide	fung	1,204	1,204
tribenuron methyl	herb	0,012	0,012
triclopyr	herb	0,045	0,045
tridemorph	fung	0,348	0,348
trifluralin	herb	0,898	0,898
trinexapac ethyl	nppp	0,096	0,096

Wheat

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,278	0,278
amidosulfuron	herb	0,016	0,016
anthraquinone	nppp	0,056	0,056
azoxystrobine-isomer	fung	0,186	0,186
bacillus thuringiensis	inse	0,201	0,201
bentazon	herb	0,338	0,338
bifenox	herb	0,207	0,207
bifenthrin	inse	0,010	0,01
bitertanol	fung	0,010	0,01
bromoxynil	herb	0,212	0,212
bromuconazole	fung	0,135	0,135
carbendazim	fung	0,173	0,173
carbosulfan	inse	0,010	0,010
carfentrazone	herb	0,240	0,24
chlormequat	nppp	0,914	0,914
chlorothalonil	fung	0,456	0,456
chlorotoluron	herb	0,702	0,702
chlorpyrifos	inse	0,371	0,371
chlorpyrifos-methyl	inse	0,089	0,089
cinidon-ethyl	herb	0,031	0,031
clopyralid	herb	0,025	0,025
copper oxychloride	fung	0,666	0,666
cyfluthrin	inse	0,007	0,007
cymoxanil	fung	0,003	0,003
cypermethrin	inse	0,012	0,012
cypermethrin	inse	0,020	0,02
cypermethrin, alpha-	inse	0,011	0,011
cyproconazole	fung	0,063	0,063
cyprodinil	fung	0,257	0,257
deltamethrin	inse	0,006	0,006
dicamba	herb	0,020	0,02
dichloorprop(-p)	herb	0,567	0,567
dichlorophen	herb	0,108	0,108
diethofencarb	fung	0,058	0,058
difenoconazole	fung	0,046	0,046
diflufenican	herb	0,072	0,072
dimethoate	inse	0,372	0,372

diquat	herb	0,055	0,055
endosulfan	inse	0,100	0,1
epoxyconazole	fung	0,119	0,119
esfenvalerate	inse	0,004	0,004
estered coleseed oil	nppp	0,211	0,211
ethephon	nppp	0,151	0,151
ethoxylated fatty amines	nppp	0,134	0,134
famoxadone	fung	0,067	0,067
fenbuconazole	fung	0,032	0,032
fenoxaprop-p-ethyl+fenchlorazol-ethyl	herb	0,036	0,036
fenoxaprop-p-ethyl+mefenpyr-diethyl	herb	0,039	0,039
fenpiclonil	fung	0,009	0,009
fenpropidin	fung	0,145	0,145
fenpropimorph	fung	0,262	0,262
fenpyroximate	inse	0,004	0,004
florasulam	herb	0,003	0,003
fludioxonil	fung	0,008	0,008
fluoroglycofen ethyl	herb	0,027	0,027
flupyrsulfuron-methyl-sodium	herb	0,016	0,016
fluquinconazole	fung	0,094	0,094
fluroxypyr	herb	0,092	0,18
flurtamone	herb	0,162	0,162
flusilazole	fung	0,079	0,079
flutolanil	fung	0,184	0,184
flutriafol	fung	0,026	0,013
fluvalinate	inse	0,025	0,025
glyphosate	herb	0,459	0,459
glyphosate-trimethylsulfonium	herb	0,946	0,946
heptenophos	inse	0,052	0,052
hexaconazole	fung	0,061	0,061
imazamethabenz	herb	0,174	0,174
imazaquin	nppp	0,001	0,001
ioxynil	herb	0,130	0,13
iprodione	fung	0,107	0,107
iron sulfate	herb	0,660	0,660
isodecyl alcohol ethoxylate	nppp	0,140	0,140
isoproturon	herb	0,989	0,989
isoxaben	herb	0,044	0,044
kresoxim-methyl	fung	0,106	0,106
lambda-cyhalothrin	inse	0,005	0,005
lindane	inse	0,509	0,509
linuron	herb	0,259	0,259
mancozeb	fung	1,101	1,101
maneb	fung	0,331	0,331
mcpa	herb	0,368	0,368
mecoprop(-p)	herb	0,314	0,314
mepiquat chloride	nppp	0,037	0,037
metaldehyde	inse	0,039	0,039
metconazole	fung	0,042	0,042
methabenzthiazuron	herb	1,246	1,246
methiocarb	inse	0,146	0,146
metsulfuron methyl ester	herb	0,004	0,004
mineral oil	nppp	0,703	0,703
mineral oil	nppp	1,664	1,664

nonyl phenol polyglycoether	nppp	0,077	0,077
nonylphenol polyethylene glycol ether	nppp	0,224	0,224
oxadixyl	fung	0,006	0,006
parathion	inse	0,109	0,109
parathion methyl	inse	0,128	0,128
penconazole	fung	0,027	0,027
pendimethalin	herb	0,507	0,507
pirimicarb	inse	0,080	0,080
prochloraz	fung	0,221	0,221
propiconazole	fung	0,078	0,078
prosulfocarb	herb	2,009	2,009
pyraflufen-ethyl	herb	0,003	0,003
quinoxifen	fung	0,037	0,037
spiroxamine	fung	0,260	0,26
sulfosulfuron	herb	0,029	0,029
sulphur	fung	2,868	2,868
tebuconazole	fung	0,139	0,139
tetraconazole	fung	0,044	0,044
thifensulfuron methyl ester	herb	0,020	0,04
thiodicarb	inse	0,079	0,079
thiometon	inse	0,040	0,04
thiophanate-methyl	fung	0,300	0,300
triadimenol	fung	0,059	0,059
triasulfuron	herb	0,008	0,008
tribenuron methyl	herb	0,041	0,041
tridemorph	fung	0,314	0,314
trifloxystrobine	fung	0,147	0,147
trifluralin	herb	0,635	0,635
trinexapac ethyl	nppp	0,066	0,066

Sugarbeet

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
aldicarb	inse	0,479	0,479
amitraz	inse	0,023	0,032
azoxystrobine-isomer	fung	0,537	0,537
captan	fung	4,851	4,851
carbendazim	fung	0,178	0,178
carbofuran	inse	0,766	0,766
chloridazon	herb	1,485	1,485
chlorothalonil	fung	0,038	0,038
chlorpyrifos	inse	0,428	0,428
chlorpyrifos-methyl	inse	0,223	0,223
clethodim	herb	0,093	0,093
clopyralid	herb	0,034	0,034
cycloxydim	herb	0,121	0,121
cymoxanil	fung	0,181	0,181
cypermethrin	inse	0,024	0,024
cypermethrin	inse	0,003	0,003
cyproconazole	fung	0,067	0,067
deltamethrin	inse	0,005	0,005

desmedipham	herb	0,036	0,036
diazinon	inse	0,268	0,134
difenoconazole	fung	0,085	0,085
dimethenamid	herb	0,518	0,518
dimethoate	inse	0,127	0,127
dimethomorph	fung	0,051	0,051
diquat	herb	0,049	0,049
endosulfan	inse	0,146	0,146
epoxyconazole	fung	0,176	0,088
esfenvalerate	inse	0,011	0,011
estered coleseed oil	nppp	0,852	0,852
ethiofencarb	inse	0,496	0,496
ethofumesate	herb	0,432	0,432
fenpropidin	fung	0,286	0,286
fenpropimorph	fung	0,647	0,647
fentin acetate	fung	0,137	0,137
fentin hydroxyde	fung	0,417	0,417
fipronil	inse	0,082	0,082
fluazifop-p butyl ester	herb	0,086	0,086
fluquinconazole	fung	0,085	0,085
flusilazole	fung	0,169	0,169
flutriafol	fung	0,087	0,087
fluvalinate	inse	0,032	0,032
glyphosate	herb	0,670	0,67
glyphosate-trimethylsulfonium	herb	1,173	1,173
haloxyfop ethoxyethyl ester	herb	0,034	0,034
heptenophos	inse	0,068	0,068
isodecyl alcool ethoxylate	nppp	0,160	0,160
kresoxim-methyl	fung	0,132	0,132
lambda-cyhalothrin	inse	0,005	0,005
lenacil	herb	0,369	0,369
lindane	inse	0,929	0,929
mancozeb	fung	5,229	2,614
maneb	fung	1,190	1,19
metamitron	herb	1,058	1,058
methiocarb	inse	0,845	0,845
metiram	fung	0,800	0,800
metolachlor	herb	0,986	0,986
mineral oil	inse	0,746	0,746
mineral oil	nppp	1,295	1,295
mineral oil	nppp	0,759	0,759
nonyl phenol polyglycoether	nppp	0,183	0,183
nonylphenol-decaethyleenglycol	nppp	0,090	0,090
nonylphenol polyethylene glycol ether	nppp	0,212	0,212
nonylphenol polyethylene glycol ether	nppp	0,130	0,130
oxydemeton methyl	inse	0,059	0,059
paraquat	herb	0,102	0,102
parathion	inse	0,156	0,156
phenmedipham	herb	0,382	0,382
pirimicarb	inse	0,124	0,124
prochloraz	fung	0,310	0,31
propaquizafop	herb	0,036	0,036
propiconazole	fung	0,086	0,086
quinmerac	herb	0,103	0,103

quinoxifen	fung	0,077	0,077
quizalofop-p-ethyl	herb	0,024	0,024
sethoxydim	herb	0,055	0,055
spiroxamine	fung	1,339	1,339
sulphur	fung	5,064	5,064
tebuconazole	fung	0,074	0,074
tetraconazole	fung	0,092	0,092
thiometon	inse	0,152	0,152
triadimenol	fung	0,065	0,065
tri-allate	herb	0,532	0,532
tridemorph	fung	0,665	0,665
triflusaluron methyl ester	herb	0,243	0,243

Maize

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,101	0,101
alkyl-aryl-polyglycoether	nppp	0,076	0,076
atrazine	herb	0,742	0,742
azoxystrobine-isomer	fung	0,225	0,225
bentazon	herb	0,491	0,491
bromoxynil	herb	0,092	0,092
carbendazim	fung	0,022	0,022
carbofuran	inse	0,401	0,401
carbosulfan	inse	0,648	0,648
chlormequat	nppp	0,883	0,883
chlorpyrifos	inse	0,061	0,061
clopyralid	herb	0,020	0,02
cymoxanil	fung	0,299	0,299
cyproconazole	fung	0,072	0,072
diazinon	inse	0,098	0,098
dicamba	herb	0,095	0,095
dimethenamid	herb	0,856	0,856
diquat	herb	0,050	0,05
estered coleseed oil	nppp	0,781	0,781
ethephon	nppp	0,041	0,041
flufenacet	herb	0,362	0,362
fluroxypyr	herb	0,040	0,04
glyphosate	herb	0,382	0,382
glyphosate-trimethylsulfonium	herb	0,832	0,832
isodecyl alcool ethoxylate	nppp	0,208	0,208
isoxaflutole	herb	0,064	0,064
lambda-cyhalothrin	inse	0,005	0,005
lindane	inse	0,514	0,514
mancozeb	fung	4,322	4,322
metaldehyde	nppp	0,062	0,062
metconazole	fung	0,014	0,014
methiocarb	nppp	0,111	0,111
metolachlor	herb	1,026	1,026
metosulam	herb	0,017	0,017
mineral oil	nppp	0,796	0,796

mineral oil	nppp	0,948	0,948
neutral hydrocarbons	nppp	0,018	0,018
nicosulfuron	herb	0,015	0,015
nonyl phenol polyglycoether	nppp	0,477	0,477
nonylphenol-decaethyleenglycol	nppp	0,057	0,057
nonylphenol polyethylene glycol ether	nppp	0,056	0,056
oleic acid	nppp	0,118	0,118
organic bases	nppp	0,075	0,075
paraquat	herb	0,076	0,076
parathion	inse	0,164	0,164
pendimethalin	herb	0,748	0,748
pirimicarb	inse	0,127	0,127
propachlor	herb	0,079	0,079
propiconazole	fung	0,018	0,018
pyridate	herb	0,375	0,375
rimsulfuron	herb	0,007	0,007
simazine	herb	0,090	0,090
sulcotrione	herb	0,230	0,23
tebuconazole	fung	0,183	0,183
thiodicarb	nppp	0,042	0,042
thiram	fung	0,264	0,264
triadimenol	fung	0,124	0,124
trifloxystrobine	fung	0,169	0,169

Corn

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,334	0,334
atrazine	herb	0,632	0,632
bentazon	herb	0,430	0,430
bitertanol	fung	0,001	0,001
bromoxynil	herb	0,067	0,067
carbofuran	inse	0,085	0,085
clopyralid	herb	0,034	0,034
cyfluthrin	inse	0,000	0,000
cymoxanil	fung	0,450	0,450
dicamba	herb	0,075	0,075
dimethenamid	herb	0,832	0,832
ethephon	nppp	0,070	0,070
flufenacet	herb	0,362	0,362
fluroxypyr	herb	0,027	0,027
glyphosate	herb	0,693	0,693
isodecyl alcool ethoxylate	nppp	0,087	0,087
isoxaflutole	herb	0,048	0,048
lindane	inse	0,696	0,696
mancozeb	fung	6,500	6,500
methiocarb	inse	0,103	0,103
metolachlor	herb	1,111	1,111
metosulam	herb	0,015	0,015
mineral oil	nppp	0,908	0,908
nicosulfuron	herb	0,021	0,021

nonylphenol polyethylene glycol ether	nppp	0,050	0,050
pendimethalin	herb	0,674	0,674
phoxim	inse	0,009	0,009
propachlor	herb	2,000	2,000
pyridate	herb	0,201	0,201
rimsulfuron	herb	0,003	0,003
sulcotrione	herb	0,217	0,217

Permanent grassland

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,101	0,101
amitrole	herb	0,024	0,024
asulam	herb	0,093	0,093
atrazine	herb	0,110	0,110
bentazon	herb	0,068	0,068
bifenox	herb	0,067	0,067
chlorpyrifos	inse	0,232	0,232
clopyralid	herb	0,012	0,012
cypermethrin	inse	0,010	0,010
diazinon	inse	0,093	0,093
dicamba	herb	0,013	0,013
dichlobenil	herb	0,012	0,012
dichlorprop	herb	0,260	0,260
dichlorprop-p	herb	0,161	0,161
diflufenican	herb	0,012	0,012
diquat	herb	0,028	0,028
diuron	herb	0,040	0,040
ethofumesate	herb	0,226	0,226
fluroxypyr	herb	0,030	0,030
glufosinate ammonium salt (1:1)	herb	0,031	0,031
glyphosate	herb	0,172	0,172
imazamethabenz methyl ester	herb	0,100	0,100
imazapyr	herb	0,009	0,009
ioxynil	herb	0,150	0,150
isoproturon	herb	0,410	0,410
isoxaben	herb	0,006	0,006
lindane	inse	0,275	0,275
mcpa	herb	0,160	0,160
mcpb	herb	0,202	0,202
mecoprop	herb	0,150	0,150
mecoprop-p	herb	0,110	0,110
metazachlor	herb	0,024	0,024
metsulfuron methyl ester	herb	0,001	0,001
paraquat	herb	0,070	0,070
parathion	inse	0,188	0,188
permethrin	inse	0,004	0,004
prosulfocarb	herb	0,128	0,128
simazine	herb	0,105	0,105
sodium chlorate	herb	0,090	0,090

thifensulfuron methyl ester	herb	0,005	0,005
trichlorfon	inse	0,019	0,019
triclopyr	herb	0,020	0,020
trifluralin	herb	0,434	0,434

Temporary grassland

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
2,4-d	herb	0,303	0,303
asulam	herb	0,296	0,296
bentazon	herb	0,267	0,267
clopyralid	herb	0,004	0,004
dichlorprop-p	herb	0,558	0,558
ethofumesate	herb	0,506	0,506
fluroxypyr	herb	0,025	0,025
glyphosate	herb	0,411	0,411
glyphosate-trimethylsulfonium	herb	1,477	1,477
ioxynil	herb	0,002	0,002
isoxaben	herb	0,101	0,101
mcpa	herb	0,197	0,197
mcpb	herb	0,364	0,364
mecoprop	herb	0,600	0,600
mecoprop-p	herb	0,234	0,234
metsulfuron methyl ester	herb	0,003	0,003

Bean

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
bentazon	herb	0,035	0,035
carbendazim	fung	0,225	0,225
deltamethrin	inse	0,004	0,004
dimethoate	inse	0,100	0,100
ethofumesate	herb	0,025	0,025
fomesafen	herb	0,092	0,092
iprodione	fung	0,480	0,480
lambda-cyhalothrin	inse	0,030	0,030
metobromuron	herb	0,500	0,500
metolachlor	herb	0,144	0,144
pirimicarb	inse	0,060	0,060
thiram	fung	1,620	1,620
tolyfluanid	fung	0,225	0,225
tri-allate	herb	0,025	0,025

Cabbage

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
carbendazim	fung	0,066	0,066
desmetryn	herb	0,109	0,109
iprodione	fung	0,256	0,256
metazachlor	herb	0,375	0,375
propachlor	herb	2,700	2,700
propamocarb	fung	0,900	0,900
pyridate	herb	0,281	0,281
trifluralin	herb	1,200	1,200

Carrot

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
carbendazim	fung	1,837	1,837
clomazone	herb	0,050	0,050
deltamethrin	inse	0,070	0,070
fluazifop-p butyl ester	herb	0,050	0,050
heptenophos	inse	1,120	1,120
iprodione	fung	3,675	3,675
linuron	herb	0,157	0,157
metoxuron	herb	2,800	2,800
monalide	herb	0,800	0,800
sulphur	fung	21,000	4,200

Leek

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
1,3-dichloropropene	sode	0,725	0,725
acephate	inse	0,552	0,552
benalaxyl	fung	0,329	0,164
bitertanol	fung	0,125	0,125
bromofenoxim	herb	0,124	0,124
bromoxynil	herb	0,109	0,109
captan	fung	0,981	0,981
carbendazim	fung	0,477	0,477
carbofuran	inse	0,122	0,122
carbosulfan	inse	0,051	0,051
chlorfenvinphos	inse	0,267	0,267
chlorothalonil	fung	0,559	0,559
chlorpropham	herb	0,088	0,088
chlorpyrifos	inse	0,568	0,568
copper hydroxyde	fung	0,606	0,606
copper oxychloride	fung	2,500	2,500
cyanazine	herb	0,684	0,684
cyfluthrin	inse	0,024	0,024
cymoxanil	fung	0,104	0,104

cyproconazole	fung	0,071	0,071
dazomet	sode	7,077	7,077
deltamethrin	inse	0,009	0,009
difenoconazole	fung	0,167	0,167
dimethenamid	herb	3,673	3,673
dimethoate	inse	1,146	1,146
dimethomorph	fung	0,302	0,302
endosulfan	inse	1,206	1,206
epoxyconazole	fung	0,061	0,061
esfenvalerate	inse	0,004	0,004
fenpropimorph	fung	1,233	0,616
fentin acetate	fung	0,114	0,114
fluazifop-p butyl ester	herb	0,099	0,099
furathiocarb	inse	0,645	0,321
glufosinate ammonium salt (1:1)	herb	0,013	0,013
glyphosate	herb	0,817	0,817
haloxyfop ethoxyethyl ester	herb	0,082	0,082
heptenophos	inse	0,090	0,090
iprodione	fung	0,722	0,722
iron sulfate	herb	3,852	3,852
kresoxim-methyl	fung	0,061	0,061
lambda-cyhalothrin	inse	0,010	0,005
mancozeb	fung	8,473	2,824
maneb	fung	4,993	2,496
metalaxyl	fung	0,328	0,328
metalaxyl-m	fung	0,047	0,047
metaldehyde	inse	0,006	0,006
metam-sodium	sode	4,310	4,310
metazachlor	herb	0,359	0,359
methabenzthiazuron	herb	0,695	0,695
methidathion	inse	0,875	0,875
methiocarb	inse	1,041	0,52
methomyl	inse	0,188	0,188
metiram	fung	4,706	4,706
metolachlor	herb	2,198	2,198
mevinphos	inse	0,075	0,075
mineral oil	nppp	0,558	0,558
nonyl phenol polyglycoether	nppp	0,457	0,457
nonylphenol polyethylene glycol ether	nppp	0,891	0,891
omethoate	inse	1,201	1,201
oxadixyl	fung	0,226	0,226
paraquat	herb	0,185	0,185
parathion	inse	0,642	0,642
pendimethalin	herb	0,129	0,129
permethrin	inse	0,104	0,104
pirimicarb	inse	0,200	0,200
propachlor	herb	1,056	1,056
propamocarb	fung	0,206	0,206
propineb	fung	0,093	0,093
propoxur	inse	0,470	0,470
pyridate	herb	0,500	0,500
quinmerac	herb	0,108	0,108
sethoxydim	herb	0,057	0,057
tebuconazole	fung	0,517	0,258

thiophanate-methyl	fung	1,893	1,893
tolclofos-methyl	fung	0,167	0,167
tolyfluanid	fung	0,344	0,344
triadimenol	fung	0,125	0,125

Pea

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
aclonifen	herb	1,062	1,062
bentazon	herb	0,175	0,175
carbendazim	fung	0,105	0,105
chlorothalonil	fung	0,225	0,225
cyanazine	herb	0,050	0,050
fluvalinate	inse	0,029	0,029
iprodione	fung	0,210	0,210
lambda-cyhalothrin	inse	0,005	0,005
mancozeb	fung	2,000	2,000
mcpb	herb	0,240	0,240
pendimethalin	herb	0,056	0,056
pirimicarb	inse	0,100	0,100
simazine	herb	0,175	0,175
thiometon	inse	0,080	0,080

Spinach

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
asulam	herb	0,900	0,900
deltamethrin	inse	0,004	0,004
ethofumesate	herb	0,300	0,300
lambda-cyhalothrin	inse	0,030	0,030
lenacil	herb	0,500	0,500
phenmedipham	herb	0,144	0,144
pirimicarb	inse	0,060	0,060
tri-allate	herb	1,704	1,704

Chicory

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
asulam	herb	0,570	0,57
benfluralin	herb	1,512	1,512
benomyl	fung	0,237	0,237
carbendazim	fung	0,516	0,516
carbetamide	herb	0,960	0,96
carbofuran	inse	0,952	0,952
carbosulfan	inse	1,446	1,446
chlorpropham	herb	0,612	0,612

copper hydroxyde	fung	0,750	0,75
copper oxychloride	fung	5,556	1,111
cyfluthrin	inse	0,025	0,025
cymoxanil	fung	0,150	0,150
deltamethrin	inse	0,002	0,002
dimethoate	inse	0,705	0,176
diquat	herb	0,316	0,316
fluazifop-p butyl ester	herb	0,039	0,039
flusilazole	fung	0,144	0,144
flutriafol	fung	0,103	0,103
glyphosate	herb	1,182	1,182
glyphosate-trimethylsulfonium	herb	2,812	2,812
heptenophos	inse	0,031	0,031
iprodione	fung	0,625	0,625
isodecyl alcool ethoxylate	nppp	0,055	0,055
isoxaben	herb	0,033	0,033
lambda-cyhalothrin	inse	0,008	0,008
lindane	inse	0,554	0,554
mancozeb	fung	2,167	2,167
oxydemeton methyl	inse	0,028	0,028
paraquat	herb	0,561	0,561
parathion	inse	0,091	0,091
phenmedipham	herb	0,095	0,095
pirimicarb	inse	0,180	0,18
pronamide	herb	0,624	0,624
spiroxamine	fung	0,702	0,702
thiabendazole	fung	0,373	0,373
thiometon	inse	0,168	0,168
thiophanate-methyl	fung	1,077	1,077
triflurosulfuron methyl ester	herb	0,006	0,006
vinclozolin	fung	0,644	0,644
ziram	fung	0,430	0,430

Colza

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
carbendazim	fung	0,186	0,186
carbetamide	herb	0,508	0,508
clomazone	herb	0,060	0,060
fluazifop-p butyl ester	herb	0,125	0,125
iprodione	fung	0,050	0,050
lambda-cyhalothrin	inse	0,008	0,008
metaldehyde	inse	0,300	0,300
metazachlor	herb	0,750	0,750
methiocarb	inse	0,160	0,160

Flax

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
amidosulfuron	herb	0,013	0,013
bentazon	herb	0,027	0,027
bifenthrin	inse	0,200	0,200
bromoxynil	herb	0,127	0,127
flupyrsulfuron-methyl-sodium	herb	0,002	0,002
haloxyfop ethoxyethyl ester	herb	0,024	0,024
lambda-cyhalothrin	inse	0,005	0,005
lenacil	herb	0,344	0,344
linuron	herb	0,245	0,245
mcpa	herb	0,127	0,127
metsulfuron methyl ester	herb	0,003	0,003

Greenhouse vegetables

Active substance	Category	Average dose applied in Belgium (kg/ha), (Van Lierde)	In the case of multi-applications (kg/ha)
1,3-dichloropropene	sode	312	312
abamectin	inse	0,023	0,023
azaconazole	fung	0,285	0,285
benfluralin	herb	1,895	1,895
benomyl	fung	0,576	0,576
bifenthrin	inse	0,098	0,049
bitertanol	fung	0,819	0,273
buprofezin	inse	0,136	0,027
carbendazim	fung	1,969	0,492
carbofuran	inse	0,577	0,577
chlorfenvinphos	inse	0,679	0,679
chloropicrin	sode	9,000	9
chlorothalonil	fung	3,441	1,147
chlorpropham	herb	0,862	0,862
chlorpyrifos	inse	0,652	0,652
chlorpyrifos-methyl	inse	0,759	0,759
cyfluthrin	inse	0,002	0,002
cypermethrin	inse	0,076	0,076
cyromazin	inse	0,421	0,14
dazomet	sode	2,904	2,904
deltamethrin	inse	0,085	0,028
dichlorvos	inse	3,380	0,676
dicloran	fung	28,085	14,040
diethofencarb	fung	1,500	1,500
diquat	herb	0,838	0,838
endosulfan	inse	0,376	0,376
esfenvalerate	inse	0,025	0,025
etridiazole	fung	0,572	0,572
fenbutatin oxide	inse	1,639	0,25
fentin acetate	fung	0,291	0,291
formetanate	inse	0,308	0,308
furathiocarb	inse	0,941	0,470

glufosinate ammonium salt (1:1)	herb	0,568	0,568
glyphosate	herb	5,165	2,582
haloxyfop ethoxyethyl ester	herb	0,290	0,29
heptenophos	inse	0,868	0,868
hexythiazox	inse	0,225	0,03
imazalil	fung	0,393	0,060
imidacloprid	inse	0,243	0,243
iprodione	fung	6,561	2,500
lambda-cyhalothrin	inse	0,037	0,018
mancozeb	fung	3,380	1,690
maneb	fung	9,230	1,846
mepronil	fung	1,588	1,588
metalaxyl	fung	0,670	0,670
metaldehyde	inse	1,079	1,079
methiocarb	inse	0,936	0,936
methomyl	inse	1,246	0,415
methyl bromide	sode	441	441
mevinphos	inse	0,203	0,203
monalide	herb	1,948	1,948
myclobutanil	fung	0,240	0,060
omethoate	inse	1,076	0,358
oxamyl	sode	1,575	1,575
oxydemeton methyl	inse	0,700	0,140
paraquat	herb	0,832	0,832
parathion	inse	0,905	0,301
penconazole	fung	0,305	0,305
permethrin	inse	0,148	0,049
phoxim	inse	0,016	0,016
piperonyl butoxide	inse	0,005	0,005
pirimicarb	inse	1,679	0,279
pirimiphos-methyl	inse	0,087	0,087
procymidone	fung	1,362	0,681
propachlor	herb	1,414	1,414
propamocarb	fung	8,650	8,650
propineb	fung	0,178	0,178
pyrethrins	inse	0,001	0,001
pyridaben	inse	0,345	0,345
pyrimethanil	fung	2,283	0,570
pyriproxyfen	inse	0,106	0,106
sulfotep	sode	3,464	3,464
sulphur	fung	33,978	1,998
tebuconazole	fung	2,750	0,910
tebufenozide	inse	0,565	0,120
tebufenpyrad	inse	0,273	0,136
teflubenzuron	inse	0,215	0,215
thiodicarb	inse	0,211	0,211
thiophanate-methyl	fung	2,130	0,532
thiram	fung	27,378	1,360
tolclofos-methyl	fung	3,724	3,724
tolyfluanid	fung	4,099	0,683
triadimefon	fung	0,849	0,100
triflumizole	fung	0,336	0,112
vinclozolin	fung	3,050	1,016
zineb	fung	3,467	3,467

ziram		fung	1,720	1,720
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ANNEX II: LISTS OF RISKIEST APPLICATIONS (P95)

Note: In each list, the application case at the highest number (end of list, right) has the highest Risk Index value. Each list represents the 5% of frequency in the concerned group corresponding to the riskiest applications. When no percentile 95 was calculated, the riskiest application is mentioned. A case of application represents the application of an active substance on a determined crop which is not detailed here.

1) Application cases with RI > Percentile 95, Water Organisms 2001

ALL

[1]	fluvalinate	paraquat	thiram
[4]	heptenophos	fluvalinate	methabenzthiazuron
[7]	lenacil	fenazaquin	mancozeb
[10]	deltamethrin	metiram	dazomet
[13]	lenacil	paraquat	heptenophos
[16]	deltamethrin	lambda-cyhalothrin	endosulfan
[19]	lambda-cyhalothrin	fenbutatin oxide	tri-allate
[22]	fenazaquin	chlorotoluron	lenacil
[25]	fentin acetate	omethoate	fenpropidin
[28]	dimethenamid	deltamethrin	diazinon
[31]	bifenox	diazinon	pyridaben
[34]	fentin acetate	methabenzthiazuron	methabenzthiazuron
[37]	chlorotoluron	paraquat	deltamethrin
[40]	deltamethrin	endosulfan	deltamethrin
[43]	azocyclotin	paraquat	paraquat
[46]	chlorotoluron	bifenox	diazinon
[49]	paraquat	bifenthrin	diazinon
[52]	oxydemeton methyl	endosulfan	heptenophos
[55]	azocyclotin	flucycloxuron	diflubenzuron
[58]	pyridaben	deltamethrin	parathion
[61]	fenpropidin	fenpropidin	deltamethrin
[64]	parathion	lindane	fentin acetate
[67]	pyrifenox	parathion	chlorotoluron
[70]	deltamethrin	diflubenzuron	dodine
[73]	aclonifen	dodine	aclonifen
[76]	parathion	furathiocarb	parathion
[79]	paraquat	fenpropidin	omethoate
[82]	parathion	monolinuron	paraquat
[85]	diazinon	lindane	lindane
[88]	lindane	parathion	lindane
[91]	parathion	bifenthrin	endosulfan
[94]	monolinuron	carbosulfan	lindane
[97]	carbaryl	lindane	endosulfan
[100]	permethrin	heptenophos	endosulfan
[103]	cypermethrin	lindane	phosalone
[106]	phosalone	cypermethrin	parathion

[109] deltamethrin carbaryl cypermethrin
 [112] flufenoxuron cypermethrin cypermethrin
 [115] cypermethrin flufenoxuron **bifenthrin** (highest RI)

INSE

[1] cypermethrin lindane phosalone phosalone cypermethrin
 [6] parathion deltamethrin carbaryl cypermethrin flufenoxuron
 [11] cypermethrin cypermethrin cypermethrin flufenoxuron **bifenthrin**

FUNG

[1] mancozeb chlorothalonil spiroxamine mancozeb thiram
 [6] thiram thiram mancozeb metiram fentin acetate
 [11] fenpropidin fentin acetate fenpropidin fenpropidin fentin acetate
 [16] pyrifenoxy dodine dodine **fenpropidin**

HERB

[1] prosulfocarb paraquat paraquat methabenzthiazuron
 [5] lenacil lenacil paraquat tri-allate
 [9] chlorotoluron lenacil dimethenamid bifenoxy
 [13] methabenzthiazuron methabenzthiazuron chlorotoluron paraquat
 [17] paraquat paraquat chlorotoluron bifenoxy
 [21] paraquat chlorotoluron aclonifen aclonifen
 [25] paraquat monolinuron paraquat **monolinuron**

POTATO

[1] carbofuran chlorpyrifos fluvalinate paraquat
 [5] oxydemeton methyl endosulfan heptenophos fentin acetate
 [9] deltamethrin aclonifen fenpropidin monolinuron
 [13] diazinon parathion lindane **cypermethrin**

ORCHARD

[1] dodine dodine omethoate parathion endosulfan
 [6] monolinuron carbaryl endosulfan phosalone phosalone
 [11] carbaryl flufenoxuron cypermethrin **flufenoxuron**

CEREAL

[1] prosulfocarb fluvalinate endosulfan fenpropidin
 [5] bifenoxy methabenzthiazuron methabenzthiazuron chlorotoluron
 [9] deltamethrin deltamethrin bifenoxy bifenthrin
 [13] fenpropidin parathion parathion chlorotoluron
 [17] paraquat lindane bifenthrin lindane
 [21] cypermethrin **cypermethrin**

SUGAR

[1] deltamethrin fentin acetate endosulfan diazinon parathion
[6] fenpropidin parathion paraquat lindane lindane
[11] **cypermethrin**

MAIZE

[1] dimethenamid mancozeb paraquat mancozeb diazinon
[6] parathion lindane lindane **carbosulfan**

FODDER

[1] mcpcb prosulfocarb isoproturon chlorpyrifos trichlorfon
[6] permethrin bifenox paraquat diazinon lindane
[11] parathion **cypermethrin**

VEGETABLES

[1] aclonifen furathiocarb permethrin heptenophos endosulfan
[6] parathion **deltamethrin**

INDUSTRIAL

[1] **bifenthrin**

GREENHOUSE

[1] deltamethrin paraquat parathion heptenophos
[5] bifenthrin methyl bromide pyridaben pirimiphos-methyl
[9] sulfotep dichlorvos **cypermethrin**

2) Application cases with RI > Percentile 95, Ground Water 2001

ALL

[1] maneb mcpb
 [3] methabenzthiazuron thiophanate-methyl
 [5] imazapyr metalaxyl-m
 [7] chlormequat ethofumesate
 [9] simazine flutriafol
 [11] ethofumesate metalaxyl
 [13] azaconazole maneb
 [15] imidacloprid flutriafol
 [17] chloridazon thiophanate-methyl
 [19] simazine metalaxyl
 [21] metalaxyl-m methabenzthiazuron
 [23] dicloran mepronil
 [25] cycloxydim oxamyl
 [27] propoxur ethiofencarb
 [29] ethiofencarb oxamyl
 [31] ethiofencarb lenacil
 [33] nicosulfuron propoxur
 [35] propoxur propoxur
 [37] oxadixyl nicosulfuron
 [39] oxadixyl propoxur
 [41] oxydemeton methyl lenacil
 [43] zineb lenacil
 [45] nuarimol lenacil
 [47] oxydemeton methyl oxydemeton methyl
 [49] oxydemeton methyl 1.3-dichloropropene
 [51] methyl bromide **oxydemeton methyl**

INSE

[1] dnoc imidacloprid flucycloxuron
 [4] bromopropylate metaldehyde bromopropylate
 [7] imidacloprid imidacloprid ethiofencarb
 [10] ethoprop imidacloprid propoxur
 [13] ethiofencarb ethiofencarb ethiofencarb
 [16] propoxur propoxur propoxur
 [19] propoxur oxydemeton methyl oxydemeton methyl
 [22] oxydemeton methyl oxydemeton methyl **oxydemeton methyl**

FUNG

[1] flutolanil pyrimethanil
 [3] azaconazole procymidone
 [5] iprodione metiram
 [7] dimethomorph oxadixyl
 [9] penconazole ofurace

[11]	thiophanate-methyl	propiconazole
[13]	tebuconazole	iprodione
[15]	pyrimethanil	thiophanate-methyl
[17]	iprodione	iprodione
[19]	iprodione	thiophanate-methyl
[21]	thiophanate-methyl	iprodione
[23]	maneb	maneb
[25]	iprodione	maneb
[27]	mepronil	metalaxyl
[29]	maneb	maneb
[31]	thiophanate-methyl	metalaxyl-m
[33]	flutriafol	metalaxyl
[35]	azaconazole	maneb
[37]	flutriafol	thiophanate-methyl
[39]	metalaxyl	metalaxyl-m
[41]	dicloran	mepronil
[43]	oxadixyl	oxadixyl
[45]	zineb	nuarimol

HERB

[1]	chloridazon	simazine
[3]	methabenzthiazuron	cycloxydim
[5]	lenacil	nicosulfuron
[7]	nicosulfuron	lenacil
[9]	lenacil	lenacil

SODE

Riskiést: **lenacil**

NPPP

Riskiést: **lenacil**

POTATO

[1]	maneb	metalaxyl-m	oxamyl
[4]	ethiofencarb	propoxur	oxadixyl
[7]	oxydemeton methyl		

ORCHARD

[1]	chlorotoluron	bromopropylate
[3]	chlormequat	thiophanate-methyl
[5]	chlorotoluron	bromopropylate
[7]	isoproturon	imidacloprid
[9]	iprodione	maneb

[11] mcpb	maneb
[13] simazine	ethiofencarb
[15] mcpb	chlormequat
[17] simazine	simazine
[19] ethiofencarb	lenacil
[21] propoxur	propoxur
[23] nuarimol	oxydemeton methyl

CEREAL

[1] isoproturon	isoproturon
[3] mcpb	methabenzthiazuron

SUGAR

[1] ethiofencarb	oxydemeton methyl	lenacil
[4] oxydemeton methyl		

MAIZE

[1] nicosulfuron	nicosulfuron
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FODDER

[1] mcpb	bentazon	simazine	isoproturon
[5] mcpb	ethofumesate	imazapyr	ethofumesate

VEGETABLES

[1] simazine	ethofumesate
[3] dimethenamid	metalaxyl-m
[5] metalaxyl	maneb
[7] thiophanate-methyl	methabenzthiazuron
[9] oxadixyl	propoxur
[11] lenacil	

INDUSTRIAL

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GREENHOUSE

[1] oxydemeton methyl	1.3-dichloropropene
[3] methyl bromide	

3) Application cases with RI > Percentile 95, Bees 2001

ALL

[1] lambda-cyhalothrin lambda-cyhalothrin cyfluthrin
 [4] permethrin thiometon ethiofencarb
 [7] deltamethrin lambda-cyhalothrin propachlor
 [10] lambda-cyhalothrin heptenophos thiometon
 [13] lambda-cyhalothrin tebuconazole oxydemeton methyl
 [16] chlorpyrifos-methyl dnoc carbaryl
 [19] tebuconazole fenitrothion cypermethrin. alpha-
 [22] esfenvalerate thiometon diazinon
 [25] diazinon abamectin cypermethrin
 [28] dnoc tebuconazole cypermethrin
 [31] cyproconazole chlorpyrifos-methyl cyproconazole
 [34] carbosulfan carbaryl bifenthrin
 [37] diazinon cyproconazole lambda-cyhalothrin
 [40] dimethoate oxydemeton methyl deltamethrin
 [43] cypermethrin cypermethrin cypermethrin
 [46] chlorpyrifos methidathion cypermethrin
 [49] heptenophos cypermethrin cypermethrin
 [52] cypermethrin lindane dimethoate
 [55] dnoc fenpropathrin diazinon
 [58] imidacloprid propoxur lindane
 [61] lindane bifenthrin parathion
 [64] parathion cyfluthrin dimethoate
 [67] propoxur propoxur dimethoate
 [70] lindane chlorpyrifos parathion
 [73] lindane methidathion parathion
 [76] parathion omethoate chlorpyrifos
 [79] chlorpyrifos imidacloprid cyfluthrin
 [82] parathion lindane imidacloprid
 [85] chlorpyrifos chlorpyrifos cyfluthrin
 [88] bifenthrin cyfluthrin cyfluthrin
 [91] vamidothion vamidothion **omethoate**

INSE

[1] lindane imidacloprid chlorpyrifos chlorpyrifos cyfluthrin
 [6] bifenthrin cyfluthrin cyfluthrin vamidothion vamidothion
 [11] **omethoate**

FUNG

[1] spiroxamine iprodione spiroxamine tebuconazole tebuconazole
 [6] tebuconazole cyproconazole cyproconazole **cyproconazole**

HERB

[1] chlorotoluron prosulfocarb chlorotoluron bromoxynil bromoxynil
[6] diquat diquat paraquat chlorotoluron **propachlor**

SODE

Riskiestic : **propachlor**

NPPP

Riskiestic : **propachlor**

POTATO

[1] diquat fenpropidin ethiofencarb
[4] deltamethrin lambda-cyhalothrin heptenophos
[7] thiometon dnoc fenitrothion
[10] esfenvalerate chlorpyrifos-methyl oxydemeton methyl
[13] cypermethrin cypermethrin dimethoate
[16] diazinon propoxur cyfluthrin
[19] lindane omethoate imidacloprid
[22] parathion **chlorpyrifos**

ORCHARD

[1] deltamethrin ethiofencarb oxydemeton methyl carbaryl
[5] thiometon abamectin dnoc carbaryl
[9] diazinon methidathion cypermethrin cypermethrin
[13] dnoc fenpropathrin imidacloprid propoxur
[17] propoxur dimethoate methidathion parathion
[21] chlorpyrifos imidacloprid chlorpyrifos cyfluthrin
[25] cyfluthrin vamidothion vamidothion **omethoate**

CEREAL

[1] chlorpyrifos-methyl cypermethrin. alpha- tebuconazole
[4] cypermethrin cyproconazole cyproconazole
[7] bifenthrin cypermethrin cypermethrin
[10] cypermethrin lindane bifenthrin
[13] parathion parathion dimethoate
[16] chlorpyrifos cyfluthrin lindane
[19] **cyfluthrin**

SUGAR

Riskiestic : **cyfluthrin**

MAIZE

[1] flufenacet flufenacet cymoxanil bromoxynil

[5] mancozeb	pirimicarb	mancozeb	lambda-cyhalothrin
[9] cyfluthrin	propachlor	tebuconazole	diazinon
[13] carbosulfan	cyproconazole	chlorpyrifos	lindane
[17] lindane	parathion		

FODDER

[1] paraquat	mecoprop	ethofumesate	dichlorprop-p	permethrin
[6] diazinon	cypermethrin	lindane	chlorpyrifos	parathion

VEGETABLES

[1] dimethoate deltamethrin **heptenophos**

INDUSTRIAL

[1] lambda-cyhalothrin **bifenthrin**

GREENHOUSE

Riskiest : **bifenthrin**

4) Application cases with RI > Percentile 95, Birds 2001

ALL

[1] diquat pirimicarb mancozeb dimethoate
[5] pirimicarb captan captan chlormequat
[9] heptenophos chlorpyrifos propachlor captan
[13] lindane dimethoate methomyl chlorpyrifos
[17] thiram thiram furathiocarb chlorpyrifos
[21] pirimicarb paraquat omethoate paraquat
[25] captan dimethoate thiram dimethoate
[29] chlorpyrifos chlorpyrifos methiocarb methiocarb
[33] propachlor methidathion diazinon diazinon
[37] methiocarb methiocarb propachlor methiocarb
[41] dimethoate methidathion diazinon diazinon
[45] dimethoate parathion dichlobenil dichlobenil
[49] dichlobenil parathion parathion omethoate
[53] heptenophos dnoC parathion carbofuran
[57] parathion carbosulfan propoxur chlorfenvinphos
[61] parathion mevinphos methiocarb diazinon
[65] parathion dimethoate propoxur propoxur
[69] propoxur parathion dnoC ethoprop
[73] parathion dnoC carbosulfan fipronil
[77] chlorpyrifos carbosulfan carbofuran carbofuran
[81] carbofuran carbofuran carbofuran oxamyl
[85] **aldicarb**

INSE

[1] fipronil chlorpyrifos carbosulfan carbofuran carbofuran
[6] carbofuran carbofuran carbofuran **aldicarb**

FUNG

[1] thiram thiram captan **thiram**

HERB

[1] diquat diquat mcpb paraquat paraquat paraquat
[7] paraquat diquat diquat chlormequat propachlor paraquat
[13] paraquat propachlor propachlor dichlobenil dichlobenil **dichlobenil**

SODE

Riskiëst: **dichlobenil**

NPPP

Riskiëst: **dichlobenil**

POTATO

[1] diquat oxydemeton methyl ziram diquat
[5] heptenophos dimethoate chlorpyrifos dno
[9] carbofuran propoxur diazinon parathion
[13] ethoprop **oxamyl**

ORCHARD

[1] pirimicarb chlorpyrifos methidathion methiocarb diazinon
[6] dimethoate dichlobenil dichlobenil dichlobenil omethoate
[11] parathion propoxur propoxur dno **dno**

CEREAL

[1] diquat pirimicarb sulphur mcpb lindane
[6] pirimicarb chlorpyrifos lindane paraquat methiocarb
[11] methiocarb dimethoate parathion **parathion**

SUGAR

[1] diazinon parathion parathion fipronil carbosulfan carbofuran
[7] carbofuran **aldicarb**

MAIZE

[1] pendimethalin diquat
[3] 2.4-d propachlor
[5] glyphosate-trimethylsulfonium chlorpyrifos
[7] paraquat chlormequat
[9] lindane lindane
[11] pirimicarb mancozeb
[13] mancozeb methiocarb
[15] propachlor diazinon
[17] parathion carbosulfan
[19] carbofuran **carbofuran**

FODDER

[1] mecoprop mcpb
[3] glyphosate-trimethylsulfonium paraquat
[5] dichlorprop-p lindane
[7] ioxynil chlorpyrifos
[9] diazinon **parathion**

VEGETABLES

[1] thiram propachlor methidathion heptenophos

[5] chlorfenvinphos mevinphos methiocarb dimethoate
[9] propoxur parathion carbosulfan chlorpyrifos
[13] **carbofuran**

INDUSTRIAL

[1] **methiocarb**

GREENHOUSE

Riskiest: **methiocarb**

5) Application cases with RI > Percentile 95, Earthworms 2001

ALL

[1] carbendazim copper oxychloride copper oxychloride phenmedipham
[5] copper oxychloride heptenophos omethoate lindane
[9] fentin hydroxyde carbendazim copper hydroxyde lindane
[13] propachlor mancozeb carbosulfan lindane
[17] sulphur prosulfocarb sulphur benomyl
[21] carbendazim methidathion copper oxychloride dnoc
[25] propachlor amitraz fenpropidin carbendazim
[29] carbendazim propachlor dimethoate carbendazim
[33] dnoc sulphur carbendazim sulphur
[37] omethoate fenpropidin carbendazim carbendazim
[41] carbendazim methidathion dnoc omethoate
[45] aldicarb methidathion fenpropidin **fenpropidin**

INSE

[1] methidathion dnoc amitraz dimethoate dnoc
[6] omethoate methidathion dnoc omethoate aldicarb
[11] **methidathion**

FUNG

[1] copper oxychloride copper oxychloride fentin hydroxyde carbendazim
[5] copper hydroxyde mancozeb sulphur sulphur
[9] benomyl carbendazim copper oxychloride fenpropidin
[13] carbendazim carbendazim carbendazim sulphur
[17] carbendazim sulphur fenpropidin carbendazim
[21] carbendazim carbendazim fenpropidin **fenpropidin**

HERB

[1] phenmedipham propachlor prosulfocarb propachlor **propachlor**

SODE

Riskiest: **propachlor**

NPPP

Riskiest: **propachlor**

POTATO

[1] omethoate lindane prosulfocarb dnoc carbendazim
[6] **fenpropidin**

ORCHARD

[1] copper oxychloride copper hydroxyde sulphur sulphur
[5] carbendazim methidathion amitraz dnoc
[9] carbendazim methidathion dnoc **omethoate**

CEREAL

[1] ioxynil chlorpyrifos bromoxynil bromoxynil
[5] copper oxychloride lindane copper oxychloride dimethoate
[9] prosulfocarb carbendazim prosulfocarb lindane
[13] sulphur carbendazim sulphur fenpropidin
[17] **fenpropidin**

SUGAR

[1] carbendazim sulphur carbendazim aldicarb **fenpropidin**

MAIZE

[1] lindane mancozeb **propachlor**

FODDER

[1] diazinon mcpa
[3] glyphosate 2.4-d
[5] prosulfocarb sodium chlorate
[7] isoxaben trifluralin
[9] atrazine glyphosate-trimethylsulfonium
[11] ethofumesate chlorpyrifos
[13] ioxynil ethofumesate
[15] **lindane**

VEGETABLES

[1] sulphur omethoate carbendazim carbendazim **methidathion**

INDUSTRIAL

[1] **carbendazim**

GREENHOUSE

Riskiest: **carbendazim**

6) Application cases with RI > Percentile 95, Consumers 2001

ALL

[1] deltamethrin thiram gibberellic acid imazalil
[5] cypermethrin cypermethrin sulphur methidathion
[9] deltamethrin **sulphur**

INSE

[1] **deltamethrin**

FUNG

[1] mancozeb ziram thiram imazalil sulphur **sulphur**

HERB

[1] **gibberellic acid**

SODE

Riskiest: **gibberellic acid**

NPPP

Riskiest: **gibberellic acid**

POTATO

[1] ethoprop clethodim
[3] glufosinate ammonium salt (1:1) glufosinate ammonium salt (1:1)
[5] **deltamethrin**

ORCHARD

[1] thiram gibberellic acid imazalil cypermethrin
[5] cypermethrin sulphur methidathion **sulphur**

CEREAL

[1] **deltamethrin**

SUGAR

Riskiest: **deltamethrin**

MAIZE

Riskiest: **deltamethrin**

FODDER

Riskiest: **deltamethrin**

VEGETABLES

/

INDUSTRIAL

/

GREENHOUSE

/

7) Application cases with RI > Percentile 95, Applicators 2001

ALL

[1] isoproturon	fenpropidin
[3] ziram	isoproturon
[5] fentin acetate	mancozeb
[7] maneb	propoxur
[9] haloxyfop ethoxyethyl ester	ziram
[11] parathion	propachlor
[13] metiram	thiram
[15] parathion	chloropicrin
[17] mancozeb	dimethoate
[19] parathion	diazinon
[21] endosulfan	fenpropimorph
[23] propachlor	fenpropimorph
[25] fentin acetate	omethoate
[27] haloxyfop ethoxyethyl ester	parathion
[29] fluoroglycofen ethyl	parathion
[31] ziram	chlorfenvinphos
[33] fentin acetate	sulphur
[35] parathion	haloxyfop ethoxyethyl ester
[37] oxamyl	heptenophos
[39] sulphur	sulphur
[41] hexaconazole	parathion
[43] sulphur	chlorfenvinphos
[45] fentin acetate	dimethoate
[47] acephate	fentin hydroxyde
[49] fenpropimorph	dazomet
[51] fentin hydroxyde	methidathion
[53] omethoate	parathion
[55] omethoate	lindane
[57] lindane	lindane
[59] lindane	ethoprop
[61] omethoate	sulfotep
[63] lindane	lindane
[65] lindane	1.3-dichloropropene
[67] lindane	methyl bromide

INSE

[1] lindane ethoprop omethoate lindane lindane lindane **lindane**

FUNG

[1] fentin hydroxyde fenpropimorph **fentin hydroxyde**

HERB

[1] paraquat monalide
[3] paraquat propachlor
[5] dimethenamid mcpa
[7] metoxuron haloxyfop ethoxyethyl ester
[9] mcpa isoproturon
[11] isoproturon haloxyfop ethoxyethyl ester
[13] propachlor propachlor
[15] haloxyfop ethoxyethyl ester fluoroglycofen ethyl
[17] **haloxyfop ethoxyethyl ester**

SODE

Riskiest: **haloxyfop ethoxyethyl ester**

NPPP

Riskiest: **haloxyfop ethoxyethyl ester**

POTATO

[1] fenpropimorph omethoate ethoprop **lindane**

ORCHARD

[1] amitrol(-t) amitrol(-t) methidathion endosulfan dnoc
[6] dimethoate sulphur amitraz sulphur parathion
[11] diuron diuron dnoc methidathion **omethoate**

CEREAL

[1] isoproturon isoproturon parathion
[4] dimethoate parathion fluoroglycofen ethyl
[7] sulphur sulphur lindane
[10] **lindane**

SUGAR

[1] diazinon mancozeb
[3] paraquat dimethoate
[5] spiroxamine haloxyfop ethoxyethyl ester
[7] ziram parathion
[9] fenpropimorph parathion
[11] fentin acetate sulphur
[13] fentin hydroxyde lindane
[15] **lindane**

MAIZE

[1] mancozeb propachlor mancozeb parathion lindane **lindane**

FODDER

[1] mcpa isoproturon diazinon parathion **lindane**

VEGETABLES

[1] propachlor fentin acetate
[3] haloxyfop ethoxyethyl ester heptenophos
[5] sulphur chlorfenvinphos
[7] dimethoate acephate
[9] dazomet methidathion
[11] parathion **omethoate**

INDUSTRIAL

[1] mcpa bifenthrin
[3] **haloxyfop ethoxyethyl ester**

GREENHOUSE

[1] 1,3-dichloropropene **methylbromide**

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
2-(1-NAPHTHYL)ACETAMIDE		86-86-2	37,19	5,25	0,32	0,32	0,32	10	
2,3,6-TBA		50-31-7	91,3	15,69	0,98	0,37	0,37	10	
2,4,5-T		93-76-5	8	101,7	2	0,03	0,03	10	
2,4-D	EU	94-75-7	6,4	56	-0,83	0,05	0,15	2	24,2
2,4-DB	EU	94-82-6	7,2	37,8	1,35	0,02	0,08	1,1	1,1
2-NAPHTHYLOXYACETIC ACID		120-23-0	37,19	5,25	0,32	0,32	0,32	10	
4-INDOL-3-YLBUTYRIC ACID		133-32-4	0,35	5,25	0,32	0,01	0,01	10	33
8- HYDROXYQUINOLINE SULFATE		134-31-6	50,18	9,05	0,648	0,01	0,01	10	
ABAMECTIN	firm -> PestMan	71751-41-2	0,33	8,98	4,4	0,001	0,001	10	100
ACEPHATE	EU	30560-19-1	2,2	2,73	-0,89	0,0025	0,0028	30	1000
ACETAMIPRID	EU	160430-64-8	2,9	106,5	0,8	0,07	0,07	33,7	98,3
ACIBENZOLAR-S-METHYL	EU	135158-54-2	14	1285	3,1	0,1	0,1	81	
ACLONIFEN	firm -> PestMan	74070-46-5	80	8741	4,37	0,02	0,032	10	0,0069
ACRINATHRIN		101007-06-1	23	74132	5	0,02	0,02	10	0,82
ALACHLOR		15972-60-8	22	201,7	3,09	0,0025	0,0025	10	0,11
ALDICARB	EU	116-06-3	3,75	24,7	1,15	0,003	0,003	10	1,4
ALFA-CYPERMETHRIN	EU	67375-30-8	35	26492	5,5	0,015	0,01	10	1
ALLETHRIN		584-79-2	60	2727,3	4,96	0,02	0,02	10	
ALLOXYDIM-SODIUM		55634-91-8	20	6,9	-0,2	0,07	0,07	10	38
ALUMINIUM PHOSPHIDE		20859-73-8	1	97723,72	6,25	0,01	0,01	10	
AMIDOSULFURON	firm -> PestMan	120923-37-7	29	4,39	1,63	0,2	10,2	10	47
AMITRAZ	EU	33089-61-1	0,3	1520,6	5,5	0,01	0,003	10	12
AMITROLE	EU	61-82-5	15	91	-0,97	0,001	0,001	1	2,3
AMMONIUM GLUPHOSINATE		77182-82-2	7	84,5	-3	0,02	0,02	10	37
ANILAZINE		101-05-3	1	163,8	3,12	0,1	0,1	10	1,02
ANTHRAQUINONE		84-65-1	5	818,9	3,52	0,01	0,01	10	10
ASULAM	firm -> PestMan	3337-71-1	14	65,28	1,83	0,45	0,45	10	
ATRAZINE	EU	1912-24-9	29	163	2,5	0,005	0,01	10	0,043
AZACONAZOLE		60207-31-0	96	96,6	2,17	0,032	0,032	10	
AZAMETHIPHOS		35575-96-3	1	25,3	1,05	0,0025	0,0025	10	
AZIMSULFURON	EU	120162-55-2	3	61	0,043	0,1	0,2	10	0,012
AZINPHOS-ETHYL	EU	2642-71-9	29,2	323,7	3,18	0,005	0,0029	60	
AZINPHOS-METHYL		86-50-0	29	1051,6	2,7	0,005	0,0029	60	3,6
AZOCYCLOTIN		41083-11-8	23,5	4097,7	5,3	0,007	0,007	10	0,16

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
AZOXYSTROBIN	EU	131860-33-8	21	207	2,5	0,1	0,1	5	0,36
Bacillus thuringiensis		68038-71-1	2,7					10	
BENALAXYL	EU	71626-11-4	59	2728	3,54	0,04	0,06	10	2,4
BENAZOLIN		698836-00-0	21	35,8	1,34	0,015	0,015	10	16
BENDIOCARB		22781-23-3	10	48,3	1,64	0,004	0,004	10	1,71
BENFLURALIN		1861-40-1	35,3	4048,9	5,29	0,05	0,08	10	3,86
BENFURACARB		82560-54-1	1	1124,4	4,22	0,025	0,025	10	
BENOMYL	EU	17804-35-2	1	3275,6	1,37	0,1	0,06	1	2
BENQUINOX		495-73-8	50,18	4187,94	4,35	0,01	0,01	10	
BENSULTAP		17606-31-4	7	1120,6	2,28	0,035	0,035	10	1
BENTAZON	EU	25057-89-0	14	13	-0,46	0,1	0,13	2	10,1
BENZOIMATE		29104-30-1	25,21	127,21	2,4	0,01	0,01	10	
BENZOYLPROP-ETHYL		33878-50-1	65,27	65,28	1,84	0,03	0,03	10	
BETA-CYFLUTHRIN	EU	68359-37-5	20	64300	5,9	0,003	0,02	10	10
BIFENOX		42576-02-3	7	2448,08	4,5	0,023	0,023	10	130
BIFENTHRIN		82657-04-3	95	225844	6	0,02	0,005	10	
BINAPACRYL		485-31-4	5	15010,67	5,12	0,0025	0,0025	10	
BIOALLETHRIN		584-79-2	60,3	1950,5	4,68	0,02	0,02	10	
BIORESMETHRIN		28434-01-7	30	1997,7	4,7	0,03	0,03	10	
BITERTANOL	firm -> PestMan	70585-36-3	97	771,97	4,1	0,01	0,01	10	6,52
BOSCALID		188425-85-6	108	418,02	2,96	0,04	0,04	10	3,75
BRODIFACOUM		56073-10-0	20	86200	8,5	0,0002	0,0002	10	
BROMACIL		314-40-9	304	59,6	1,88	0,03	0,03	10	
BROMADIOLONE	firm -> PestMan	28772-56-7	88	97723,72	4,27	0,01	0,01	10	
BROMOCYCLEN		1715-40-8	25,21	957,63	3,46	0,01	0,01	10	
BROMOFENOXIM		13181-17-4	5	974,1	3,17	0,03	0,03	10	2,3
BROMOPHOS		2104-96-3	8	1655,01	3,79	0,04	0,04	10	
BROMOPHOS-ETHYL		4824-78-6	8	17,24	6,5	0,003	0,003	10	0,23
BROMOPROPYLATE		18181-80-1	59	163,8	5,4	0,03	0,03	10	0,92
BROMOXYNIL	EU	1689-84-5	4,5	173,5	1,04	0,001	0,01	10	0,12
BROMUCONAZOLE	firm -> PestMan	116255-48-2	97	771,97	3,24	0,02	0,02	10	2,1
BUMINAFOS		51249-05-9	9	146,5	1,67	0,01	0,01	10	1,4
BUPIRIMATE		41483-43-6	79	517,2	3,9	0,15	0,15	10	
BUPROFEZIN		69327-76-0	73,5	2210,2	4,3	0,01	0,015	10	2,1

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
BUTRALIN		33629-47-9	20	2631,1	4,93	0,5	0,5	10	0,12
BUTYLATE		2008-41-5	70	544,8	1,146	0,064	0,064	10	
CAPTAFOFOL		2425-06-1	1	680	3,8	0,1	0,1	10	
CAPTAN		133-06-2	1	82,8	2,79	0,1	0,125	10	
CARBARYL	firm -> PestMan	63-25-2	14	357	1,85	0,008	0,008	10	1,1
CARBENDAZIM	firm -> PestMan	10605-21-7	20	225	1,51	0,03	0,08	10	1,3
CARBETAMIDE		16118-49-3	10	89,648	-1,59	0,04	0,04	10	
CARBOFURAN	firm -> PestMan	1563-66-2	45	22	1,52	0,002	0,002	10	
CARBOSULFAN		55285-14-8	2	373,7	3,3	0,01	0,01	10	20
CARBOXIN		5234-68-4	7	21,9	2,18	0,15	0,15	10	0,48
CARFENTRAZONE-ETHYL	EU	128639-02-1	32	34,48	3,36	0,03	0,6	10	0,012
CHLORBROMURON		13360-45-7	39	758,6	2,9	0,003	0,003	10	0,017
CHLORBUFAM		1967-16-4	15	18,83	1,09	0,04	0,04	10	
CHLORFACINON		3691-35-8	88	97723,72	6,25	0,01	0,01	10	
CHLORFENVINPHOS		470-90-6	49	310,32	4,22	0,0005	0,0005	10	1,6
CHLORIDAZON	firm -> PestMan	1698-60-8	56	215	1,19	0,16	0,16	10	1,9
CHLORMEQUAT		7003-89-6	27,5	82,75	-1,59	0,05	0,4	10	1540
CHLORMEQUAT CHLORIDE	firm -> PestMan	999-81-5	14	203	-1,59	0,05	0,4	10	100
CHLOROPICRINE		76-06-2	1	6,7	3,46	0,01	0,01	10	
CHLOROXURON		1982-47-4	36	1806,75	3,4	0,033	0,033	10	
CHLORPROPHAM	EU	101-21-3	24,5	260	3,76	0,05	0,05	34	1
CHLORPYRIPHOS		2921-88-2	115	7983,8	4,7	0,01	0,01	1	
CHLORPYRIPHOS-METHYL		5598-13-0	60	3549,7	4	0,01	0,01	3	0,57
CHLORTHALONIL	firm -> PestMan	1897-45-6	14	1500	2,92	0,02	0,02	10	0,21
CHLORTIAMID		1918-13-4	42,6	734,51	3,3	0,05	0,05	10	
CHLORTOLURON		15545-48-9	63	230	2,41	0,03	0,03	10	0,024
CINIDON-ETHYL	EU	142891-20-1	1,25	869	4,5	0,01	0,02	2	0,021
CLETHODIM		99129-21-2	1	41,4	-3,81	0,01	0,01	10	57,8
CLODINAFOP-PROPARGYL	firm -> PestMan	105512-06-9	12	241,88	3,9	0,004	0,004	10	25
CLOFENTEZINE		74115-24-5	59	1025,8	3,1	0,02	0,02	10	0,0025
CLOMAZONE		81777-89-1	58,5	231	2,5	0,5	0,5	10	2,1
CLOPYRALID		57754-85-5	22,7	5,3	-2,63	0,5	1	10	5,4
CLOQUINTOCET-MEXYL	firm -> PestMan	99607-70-2	65,27	65,28	5,03	0,04	0,04	10	0,63
Coniothyrium minitans	EU		50,18	4187,94	4,35	0,01	0,01	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
COPPER(HYDROXIDE)		20427-59-2	365	182,47	2,46	0,05	0,05	10	
COPPEROXYCHINOLATE		10380-28-6	365	182,47	2,46	0,05	0,05	10	
COPPEROXYCHLORIDE		1332-40-7	365	182,47	2,46	0,05	0,05	10	
COUMAPHOS			27,6	1655,01	3,79	0,016	0,016	10	
CUMATETRALYL		5836-29-3	90	957,63	3,46	0,01	0,01	10	15,2
CUPRIC SULPHATE		7758-98-7	365	182,47	2,46	0,05	0,05	10	
CYANAMIDE		420-04-2	3,5	0	-0,82	0,01	0,01	10	13,5
CYANAZINE	firm -> PestMan	21725-46-2	14	296	2,1	0,05	0,05	10	0,1
CYAZOFAMIDE	EU	120116-88-3	14	1338	3,2	0,17	0,3	100	0,025
CYCLANILIDE	EU	113136-77-9	28	194	3,25	0,0075	0,0045	10	1,7
CYCLOATE		1134-23-2	56,2	39,7	3,88	0,11	0,11	10	
CYCLOXYDIM	firm -> PestMan	101205-02-1	6	97	1,36	0,07	0,07	10	100
CYCLURON		2163-69-1	68	226,36	2,59	0,08	0,08	10	
CYFLUTHRIN	EU	68359-37-5	33	64300	6	0,003	0,02	10	10
CYHALOFOP-BUTYL	EU	122008-85-9	0,21	5247	3,31	0,003	0,03	11	0,96
CYHALOTHRIN	EU	68085-85-8	56	24690,9	6,8	0,002	0,002	10	
CYHEXATIN		13121-70-5	111	1293	5,23	0,007	0,000071	10	10
CYIMIAZOL		61676-87-7	25,21	14,7	0,6	0,01	0,01	10	
CYMOXANIL		57966-95-7	0,7	17,24	0,62	0,05	0,03	10	5,8
CYPERMETHRIN	firm -> PestMan	52315-07-8	60	534664	6,6	0,05	0,05	10	
CYPROCONAZOLE	firm -> PestMan	94361-06-5	90	771,97	3,1	0,02	0,02	10	
CYPRODINIL	firm -> PestMan	121552-61-2	40	691	4	0,03	0,03	10	5,2
CYROMAZINE	firm -> PestMan	66215-27-8	33	957,63	-0,061	0,02	0,02	10	124
DALAPON		75-99-0	3,6	0,862	0,84	0,15	0,15	10	
DAMINOZIDE		1596-84-5	4,5	3,1	-1,51	0,5	0,23	13	5,2
DAZOMET	firm -> PestMan	533-74-4	1	51720	0,63	0,009	0,009	10	1
DELTAMETHRIN	EU	52918-63-5	21	10240000	4,6	0,01	0,0075	10	9,1
DEMETON-S-METHYL		919-86-8	7,3	34,9	1,32	0,0003	0,0003	10	22,1
DEMETON-S-METHYL SULPHON		17040-19-6	2,7	0,17	3,79	0,0003	0,0003	10	29,9
DESMEDIPHAM	EU	13684-56-5	6,9	2586	3,39	0,01	0,04	10	0,01
DESMETRYN		1014-69-3	50	205,2	2,38	0,02	0,02	10	0,004
DIALATE		2303-16-4	103	193,1	3,29	0,09	0,09	10	
DIAZINON		333-41-5	21	274,1	3,95	0,002	0,002	10	17,3
DICAMBA	firm -> PestMan	1918-00-9	14	2	-0,55	0,37	0,37	10	41

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
DICHLOBENIL		1194-65-6	70	215,5	2,7	0,002	0,002	10	10
DICHLOFENTHION		97-17-6	6	19	2,46	0,01	0,01	10	
DICHLOFUANID		1085-98-9	2	24,1	3,6	0,3	0,3	10	1
DICHLORMID		37764-25-3	8	65,06	1,84	0,01	0,01	10	
DICHLORO-1,3-PROPENE		542-75-6	13	25,86	1,7	0,01	0,01	10	5
DICHLOROPHEN		97-23-4	50	4187,94	4,35	0,2	0,2	10	
DICHLORPROP-P	firm -> PestMan	15165-67-0	25	15,69	-0,25	0,37	0,37	10	676
DICHLORVOS		62-73-7	2	150	1,9	0,004	0,004	10	52,8
DICLOBUTRAZOL		75736-33-3	96	688,24	3,81	0,0025	0,0025	10	
DICLORAN		99-30-9	282	738	2,8	0,03	0,034	10	1000
DICOFOL		115-32-2	80	10116,4	3,3	0,002	0,002	10	0,073
DIENOCHLOR		2227-17-0	10	862	5,7	0,0014	0,0014	10	0,03
DIETHATYL-ETHYL		38727-55-8	114	170,7	3,56	0,5	0,5	10	
DIETHOFENCARB	firm -> PestMan	87130-20-9	3	4187,84	3,02	0,08	0,08	10	
DIETHYL-TOLUAMIDE (DEET)		134-62-3	25,21	78,8	2	0,01	0,01	10	
DIFENACOUM		56073-07-5	290	31371,64	7	0,0002	0,0002	10	
DIFENOCONAZOLE	firm -> PestMan	119446-68-3	100	3759	4,4	0,01	0,01	10	0,032
DIFENOXURON		14214-32-5	65,27	591,33	2,2	0,01	0,01	10	0,03
DIFENZOQUAT		43222-48-6	91,3	51720	0,648	0,25	0,25	10	
DIFETHIALONE	firm -> PestMan	104653-34-1	88	10000000	5,17	0,1	0,1	10	
DIFLUBENZURON		35367-38-5	3	181,02	3,69	0,02	0,02	10	0,3
DIFLUFENICAN	firm -> PestMan	83164-33-4	154	5574	4,9	0,02	0,02	10	10
DIMEFURON		34205-21-5	170	706,84	2,51	0,02	0,02	10	0,0083
DIMETHENAMID	firm -> PestMan	87674-68-8	25	293	2,15	0,04	0,04	10	0,062
DIMETHENAMID-P	EU	163515-14-8	11,7	90	1,89	0,02	0,04	10	0,017
DIMETHIPIN		55290-64-7	149	5,6	-0,17	0,02	0,02	10	5,12
DIMETHOATE	firm -> PestMan	60-51-5	3	34	0,704	0,002	0,002	10	90,4
DIMETHOMORPH	firm -> PestMan	110488-70-5	68,5	428	2,63	0,09	0,09	10	29,2
DINICONAZOLE		83657-24-3	20	1237,5	4,3	0,005	0,005	10	
DINOCAP		39300-45-3	5,3	1649,4	4,54	0,001	0,001	10	
DINOSEB		88-85-7	5,3	255,2	2,29	0,003	0,003	10	
DINOTERB	EU	1420-07-1	9,8	124,1	2,34	0,001	0,001	10	7,4
DIQUAT	EU	2764-72-9	365	2184750	-4,6	0,002	0,001	1	0,011
DIQUAT DIBROMIDE	EU	85-00-7	365	2184750	-4,6	0,002	0,001	1	0,011

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DITHIANON	firm -> PestMan	3347-22-6	50,18	4187	3,2	0,01	0,01	10	12
DIURON	firm -> PestMan	330-54-1	135	400	2,85	0,002	0,002	10	
DNOC	EU	534-52-1	8,5	35,5	2,39	0,005	0,005	10	6
DODEMORPH		1593-77-7	73	9309,6	3,45	0,012	0,012	10	17,9
DODINE		197143-00-0	20	2342,9	4,9	0,01	0,19	10	0,0051
ENDOSULFAN	firm -> PestMan	115-29-7	50	11500	4,74	0,006	0,006	10	0,56
ENDOTHAL-SODIUM		125-67-9	8,5	120,68	-2,09	0,005	0,005	10	
ENILCONAZOLE			97	771,97	3,33	0,023	0,023	10	
EPOXICONAZOLE	firm -> PestMan	106325-08-0	75	1802	3,44	0,0032	0,0032	10	2,3
EPTC		759-94-4	47	105,2	3,2	0,05	0,05	10	1,4
ESFENVALERATE	EU	66230-04-4	85,75	630957	6,24	0,02	0,018	10	0,0065
ETHEPHON	firm -> PestMan	16672-87-0	37,19	5,25	-2,2	0,05	0,05	10	32
ETHIOFENCARB		29973-13-5	37	19	2,04	0,1	0,1	10	43
ETHION		563-12-2	90	8832,1	4,28	0,002	0,002	10	
ETHIRIMOL		23947-60-6	77	112,9	2,3	0,0075	0,0075	10	
ETHOFUMESATE	EU	26225-79-6	97	147	2,7	0,07	2,5	10	3,9
ETHOPROPHOS	firm -> PestMan	13194-48-4	50,5	1655,01	3,59	0,0004	0,0004	10	
ETHOXSULFURON	EU	126801-58-9	21	243	1,01	0,04	0,06	10	0,19
ETOFENPROX		80844-07-1	11	2861,12	5	0,03	0,03	10	
ETRIDIAZOLE	firm -> PestMan	2593-15-9	7	334	3,37	0,025	0,025	10	0,072
ETRIMFOS		38260-54-7	6,5	29,3	3,3	0,003	0,003	10	2,9
FAMOXADONE	EU	131807-57-3	6	16	4,8	0,012	0,0048	15,8	0,022
FENAMIDONE	EU	161326-34-7	8,5	388	2,8	0,03	0,3	4,3	3,84
FENAMINOSULF		140-56-7	17	19	4,35	0,5	0,5	10	38,3
FENAMIPHOS		22224-92-6	21	294,8	3,3	0,0008	0,0008	10	3,5
FENARIMOL		60168-88-9	365	1265,4	3,69	0,01	0,02	10	5,1
FENAZAQUIN		120928-09-8	45	15800,46	5,51	0,005	0,005	10	
FENBUCONAZOLE		114369-43-6	180	9568,2	3,23	0,03	0,03	10	
FENBUTATIN-OXYDE	firm -> PestMan	13356-08-6	67,25	2695,35	5,2	0,03	0,03	10	0,005
FENCHLORAZOLE-ETHYL		103112-35-2	2,4	370,7	4	0,03	0,03	10	0,41
FENHEXAMID	EU	126833-17-8	1	446	3,51	0,2	0,3	18	4,31
FENITROTHION		122-14-5	20	191,4	3,6	0,003	0,003	10	3,9
FENOXAPROP-P-ETHYL	firm -> PestMan	71283-80-2	5	241,88	4,58	0,03	0,03	10	0,51
FENOXYCARB	firm -> PestMan	72490-01-8	31	957,63	4,07	0,055	0,055	10	1,1

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
FENPICLONIL		74738-17-3	308	1982,6	4,3	0,0125	0,0125	10	0,22
FENPROPATHRIN		64257-84-7	34	1062	5,08	0,03	0,03	10	2
FENPROPIDIN	firm -> PestMan	67306-00-7	76,5	6848	2,9	0,005	0,005	10	0,0025
FENPROPIMORPH	firm -> PestMan	67564-91-4	52	5775	4,1	0,003	0,003	10	1
FENPYROXIMATE	firm -> PestMan	134098-61-6	38	3125,355829	5,01	0,01	0,01	10	
FENTHION	EU	55-38-9	1,5	1521	4,84	0,007	0,007	10	1,79
FENTIN ACETATE	EU	900-95-8	28	12018	3,43	0,0005	0,0002	4	0,032
FENTIN HYDROXIDE	EU	76-87-9	26	2241,2	3,43	0,0005	0,0002	4	0,002
FENURON		101-42-8	94	226,36	2,59	0,028	0,028	10	
FENVALERATE	EU	51630-58-1	83	2327,4	4,7	0,02	0,02	10	
FERBAM	EU	14484-64-1	56	6,9	-1,6	0,003	0,003	10	
FERRIC PHOSPHATE	EU	10045-86-0	25,21	1724000	1000	0,8	0,8	0	
FIPRONIL	firm -> PestMan	120068-37-3	365	837,5	4	0,0002	0,0002	10	0,068
FLAZASULFURON	EU	104040-78-0	18	100	-0,06	0,013	0,02	10	0,014
FLOCUMAFEN		90035-08-8	122	1394,88	4,4	0,01	0,01	10	
FLORASULAM	EU	145701-23-1	10	21,998	-1,22	0,05	0,05	12	0,00894
FLUAZIFOP-P-BUTYL	firm -> PestMan	79241-46-6	28	61,5	4,5	0,01	0,01	10	0,51
FLUAZINAM		79622-59-6	107	9189	5,7	0,004	0,0024	10	0,2
FLUBENZIMINE		37893-02-0	25,21	957,63	3,46	0,025	0,025	10	
FLUCYCLOXURON		94050-52-9	208	339,7	6,97	0,05	0,011	10	0,0022
FLUCYTHRANATE		70124-77-5	60	6547,8	4,7	0,02	0,02	10	
FLUDIOXONIL	firm -> PestMan	131341-86-1	18	1982,6	4,12	0,033	0,033	10	0,092
FLUFENACET	EU	142459-58-3	34	353,4	3,2	0,011	0,017	10	0,00204
FLUFENOXURON	firm -> PestMan	101463-69-8	42	260,36	4	0,025	0,025	10	4
FLUMEQUINE		42835-25-6	65,27	65,28	1,84	2	2	10	
FLUMIOXAZINE	EU	103361-09-7	27,5	1412	2,55	0,009	0,018	0,05	0,000852
FLUORODIFEN		15457-05-3	65,27	65,28	1,84	0,01	0,01	10	
FLUOROGLYCOFEN-ETHYL		77501-90-7	0,5	568,2	3,65	0,0006	0,0006	10	
FLUPOXAM		119126-15-7	69	360,5	3,27	0,039	0,039	10	
FLUPYRSULFURON-METHYL	EU	144740-54-5	9	28,82	1,16	0,035	0,08	10	0,0037
FLUQUINCONAZOLE	firm -> PestMan	136426-54-5	175	738	3,24	0,005	0,005	10	0,014
FLUROCHLORIDONE		61213-25-0	39	1634,4	3,36	0,05	0,05	10	0,0064
FLUROXYPYR	EU	69377-81-7	34	51	2	0,8	0,8	10	12,3
FLUROXYPYR-MEPTYL	EU	81406-37-3	3	62000	4,5	0,8	0,8	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
FLURPRIMIDOL		56425-91-3	37,19	392,1	3,34	0,014	0,014	10	0,84
FLURTAMONE	EU	96525-23-4	55,5	88	3,24	0,02	0,02	38	0,02
FLUSILAZOLE		85509-19-9	365	1660,2	3,74	0,001	0,01	7	6,6
FLUTOLANIL		66332-96-5	365	693	3,17	0,087	0,087	10	1,85
FLUTRIAFOL		76674-21-0	180	112,9	2,3	0,01	0,004	10	
FLUVALINATE		69409-94-5	7	1014117,1	3,8	0,01	0,01	10	180
FOLPET		133-07-3	4,3	297,7	3,11	0,1	0,1	10	0,15
FONOFOS		944-22-9	67	603,4	3,94	0,002	0,002	10	1,5
FORAMSULFURON	EU	173159-57-4	9,4	151	-0,78	0,5	0,1	2	3,3
FORMETANATE		22259-30-9	9	655,12	-2,7	0,05	0,05	10	1,5
FORMOTHION		2540-82-1	1	8,62	2,46	0,02	0,02	10	42,3
FOSETYL	firm -> PestMan	15845-66-2	0,042	4187,94	-2,4	2,98	2,98	10	21,9
FOSETYL-ALLUMINIUM	firm -> PestMan	39148-24-8	0,042	4187,94	-2,4	2,98	2,98	10	21,9
FOSTHIAZATE	EU	98886-44-3	14	59	1,68	0,005	0,005	10	4,51
FOXIM		14816-18-3	7,3	838,69	3,38	0,001	0,0019	10	
FUBERIDAZOLE	firm -> PestMan	3878-19-1	10	1556,51	2,67	0,005	0,08	10	12,1
FURATHIOCARB		65907-30-4	1	646,5	4,8	0,003	0,0035	10	340
GLUFOSINATE AMMONIUM	firm -> PestMan	77182-82-2	13	620	0,1	0,02	0,02	10	37
GLYPHOSATE	EU	1071-83-6	12	884	-3,2	0,3	0,2	3	72,9
GLYPHOSATE-TRIMESIUM	EU	81591-81-3	12	530	-2,9	0,2	0,1	1	
GRANULOSEVIRUS		-4-5	25,21	957,63	3,46	0,01	0,01	10	
GUAZATINE		108173-90-6	20	16,378	-1,15	0,03	0,03	10	
GUAZATINE TRIACETATE		115044-19-4	20	16,38	-1,2	0,03	0,03	10	
HALFENPROX		111872-58-3	10	107979,292	4,1	0,01414	0,01414	10	
HALOXYFOP-ETOTYL		87237-48-7	1,5	195	4,47	0,0005	0,00024	10	
HALOXYFOP-R-METHYL		72619-32-0	18,7	29916,6	4	0,0005	0,02	10	3,87
HEPTENOPHOS		23560-59-0	1,4	88,8	2,1	0,003	0,003	10	35
HEXACONAZOLE	firm -> PestMan	79983-71-4	97	771,97	3,9	0,005	0,005	10	
HEXAZINONE		51235-04-2	62	27,6	1,2	0,1	0,1	10	
HEXYTHIAZOX	firm -> PestMan	78587-05-0	8	6200	2,53	0,03	0,03	10	
HYDROQUINOLINE SULFATE		134-31-6	91,3	9,05	0,648	0,01	0,01	10	
HYMEXAZOL		10004-44-1	25	12,8	0,48	0,17	0,17	10	
IMAZALIL	EU	35554-44-0	5	2080	3,82	0,025	0,05	10	0,87
IMAZAMETHABENZ-METHYL	firm -> PestMan	81405-85-8	35	153	1,68	0,0625	0,0625	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
IMAZAMOX	EU	114311-32-9	1,7	58,7	0,7	9	14	10	0,037
IMAZAPYR		81334-34-1	91,3	10,344	1,3	0,25	2,5	10	
IMAZAQUIN	firm -> PestMan	81335-37-7	60	20	0,34	0,25	0,25	10	0,09
IMAZETHAPYR		81335-77-5	60	42,79	1,49	0,5	0,5	10	
IMIDACLOPRID	firm -> PestMan	138261-41-3	0,17	13,29	0,57	0,06	0,06	10	100
INDOL-3-YLACETIC ACID		87-51-4	0,2	5,25	0,32	0,01	0,01	10	33
INDOXACARB			25,21	957,63	3,46	0,01	0,01	10	
IODOFENPHOS		18181-70-9	25,21	11524,94	2,46	0,01	0,01	10	
IODOSULPHURON	EU	185119-76-0	8,5	45	-0,7	0,07	0,07	10	0,07
IOXYNIL	EU	1689-83-4	1,8	303	2,2	0,011	0,01	10	0,15
IPRODIONE	EU	36734-19-7	42	202	3	0,06	0,3	1	1,8
IPROVALICARB	EU	140923-17-7	50,18	61	3,2	0,015	0,015	10	
ISOCARBAMID		30979-48-7	65,27	65,28	1,84	0,01	0,01	10	
ISOFENPHOS		25311-71-1	64	267,22	3,63	0,001	0,001	10	1
ISOPROTURON	EU	34123-59-6	22,5	36	2,5	0,015	0,015	17	0,013
ISOXABEN		82558-50-7	262	862	3,94	0,066	0,066	10	1,4
ISOXAFLOTOLE	EU	141112-29-0	1,3	112	2,32	0,02	0,02	60	0,12
KRESOXIM-METHYL	EU	143390-89-0	0,6	219	3,4	0,4	0,9	10	0,024
LAMBDA-CYHALOTHRIN	EU	91465-08-6	23	157000	7	0,005	0,0025	0,3	0,3
LENACIL		2164-08-1	179	34,48	2,31	0,0125	0,41	10	0,014
LINDANE	EU	58-89-9	365	1091,292	3,85	0,001	0,001	60	1
LINURON	EU	330-55-2	47,5	410	3	0,003	0,009	3	0,016
MAGNESIUM FOSFIDE			365	182,47	2,46	0,01	0,01	10	
MALATHION		121-75-5	1	136,196	2,89	0,3	0,3	10	
MALEIC HYDRAZIDE	EU	123-33-1	3,9	19,8	0,011	0,25	0,25	38	9,84
MANCOZEB		8018-01-7	5	174,124	1,33	0,03	0,035	10	0,16
MANEB		12427-38-2	56	201,71	1,3	0,03	0,02	10	3,2
MCPA		94-74-6	20	200,3	2,75	0,005	0,005	10	392
MCPB		94-81-5	42	83,4	2,58	0,37	0,37	10	0,42
MECARBAM		2595-54-2	35	31,5	3,72	0,002	0,002	10	
MECOPROP	EU	7085-19-0	8,2	31,5	0,64	0,01	0,04	20	237
MECOPROP-P	EU	16484-77-8	8,2	135	0,02	0,01	0,04	20	16,2
MEFENPYR-DIETHYL	firm -> PestMan	135591-00-3	41	65,28	3,83	0,01	0,01	10	1,65
MEFLUIDIDE		53780-34-0	7,3	255,2	2,02	0,32	0,32	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
MEPANIPYRIM	EU	110235-47-7	75,1	874	3,28	0,02	0,07	0,26	0,23
MEPIQUAT CHLORIDE	firm -> PestMan	24307-26-4	53	2376	-2,82	1,5	1,5	10	1000
MEPRONIL		55814-41-0	48	64,1	3,66	0,05	0,05	10	
MESOSULFURON-METHYL	EU	208465-21-8	45,4	92	-0,48	1	0,2	13,9	0,2
MESOTRIONE	EU	104206-8	5	109	-1	0,01	0,015	3	3,5
METALAXYL	EU	57837-19-1	42	46,6	1,65	0,03	0,08	10	42
METALAXYL-M	EU	70630-17-0	53,2	20	1,71	0,08	0,08	10	36
METALDEHYDE		108-62-3	10	17,24	0,12	0,025	0,025	10	73,5
METAMITRON		41394-05-2	30	184,5	0,83	0,025	0,025	10	0,2
METAM-SODIUM	firm -> PestMan	137-42-8	2,1	51720	1	0,13	0,13	10	
METAZACHLOR	firm -> PestMan	67129-08-2	6	293	2,13	0,036	0,036	10	1,63
METCONAZOLE	firm -> PestMan	125116-23-6	97	1222	3,85	0,048	0,048	10	1,7
METHABENZTHIAZURON		18691-97-9	135	179,3	2,64	0,075	0,075	10	0,042
METHAMIDOPHOS		10265-92-6	2,6	8,62	-0,8	0,004	0,004	10	86
METHIDATHION		950-37-8	7	165,5	2,57	0,001	0,001	10	15,6
METHIOCARB	firm -> PestMan	2032-65-7	68	357	3,08	0,02	0,02	10	1,15
METHOMYL		16752-77-5	16	63,8	0,08	0,03	0,03	10	67
METHOXYCHLOR		72-43-5	46	86315,5	3,46	0,1	0,1	10	
METHYL BROMIDE		74-83-9	15	41,4	0,076	0,0008	0,0008	10	3,2
METHYL ISOTHIOCYANATE		556-61-6	6	5,172	1,023	0,004	0,004	10	0,248
METIRAM	firm -> PestMan	9006-42-2	2,7	250096	0,3	0,03	0,03	10	0,3
METOBROMURON		3060-89-7	30	317,2	2,41	0,03	0,03	10	0,26
METOSULAM	firm -> PestMan	139528-85-1	25	500	0,9778	0,02	0,02	10	0,075
METOXURON	firm -> PestMan	19937-59-8	20	226,36	1,6	0,028	0,028	10	
METRIBUZIN	firm -> PestMan	21087-64-9	45	296	1,6	0,013	0,013	10	0,021
METSULFURON-METHYL	EU	74223-64-6	10	39,5	-1,7	0,22	0,7	10	0,045
MEVINPHOS		26718-65-0	1,2	29,3	0,55	0,0008	0,002	18	
MOLINATE	EU	2212-67-1	28	190	2,86	0,008	0,008	2,2	0,22
MONALIDE		7187-36-7	49	787,9	1,84	0,01	0,01	10	
MONOLINURON	EU	1746-81-2	50	332,7	2,2	0,003	0,0065	10	0,001
MONURON		150-68-5	166	146,5	1,79	0,01	0,01	10	
MYCLOBUTANIL		88671-89-0	66	612,02	2,556	0,03	0,03	10	2,66
NAPROPAMIDE		15299-99-7	25	1034,4	3,3	0,3	0,3	10	
NEBURON		555-37-3	120	3134,232	2,59	0,028	0,028	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
NICOSULFURON		111991-09-4	45	0,81028	-1,7	2	2	10	
NITROFEN		1836-75-5	65,27	65,28	1,84	0,01	0,01	10	
NITROTHALE-ISOPROPYL		10552-74-6	8	1584,356	2,04	0,05	0,05	10	2,08
NUARIMOL		63284-71-9	150	6,896	3,18	0,021	0,021	10	2,5
OFURACE		58810-48-3	26	37,96	1,39	0,015	0,015	10	
OMETHOATE		1113-02-6	1	22,9	-0,75	0,002	0,0003	10	125
OXADIARGYL	EU	39807-15-3	25	1915	3,95	0,008	0,006	10,79	0,71
OXADIAZON	firm -> PestMan	19666-30-9	135	2300	4,91	0,04	0,04	10	0,006
OXADIXYL		77732-09-3	75	15,65	0,65	0,1252	0,08	10	46
OXAMYL		23135-22-0	17	6,896	-0,44	0,03	0,00086	10	1,3
OXASULFURON	EU	144651-06-9	10	49	-0,81	0,013	0,013	1	0,145
OXYCARBOXIN		5259-88-1	37	18,07	0,77	0,15	0,15	10	19
OXYDEMETON		301-12-2	107	2,96	-0,74	0,003	0,003	10	100
OXYDEMETON-METHYL		301-12-2	10	75,856	-0,74	0,0003	0,0003	10	100
PACLOBUTRAZOL	firm -> PestMan	76738-62-0	91	5,25	3,2	0,1	0,1	10	8
Paecilomyces fumosoroseus var. apopka	EU			3,09		0,01	0,01	10	
PARAQUAT	EU	4685-14-7	365	8400	-4,5	0,004	0,0004	0,5	0,00023
PARATHION	EU	56-38-2	49	3010,1	3,81	0,004	0,0006	9,7	0,5
PARATHION-METHYL	EU	298-00-0	48,9	243,08	3	0,003	0,0006	10	3
PENCONAZOLE	firm -> PestMan	66246-88-6	238	771,97	3,72	0,03	0,03	10	0,83
PENCYCURON	firm -> PestMan	66063-05-6	50,18	4187,94	4,68	0,02	0,02	10	0,56
PENDIMETHALIN	EU	40487-42-1	90	15744	5,2	0,125	0,234	10	0,006
PERMETHRIN	EU	52645-53-1	13	586,16	6,5	0,05	0,05	10	0,0125
PHENMEDIPHAM	EU	13684-63-4	22,85	867,5	3,59	0,03	0,13	10	86
PHOSALONE		2310-17-0	3	2091,2	4,3	0,02	0,02	10	0,68
PHOSFAMIDONE		13171-21-6	90	8,6	0,79	0,0005	0,0005	10	260
PHOSMET		732-11-6	7	358,6	2,89	0,01	0,01	10	
PICLORAM		6607-00-0	60	25,86	0,98	0,2	0,2	10	36,9
PICOLINAFEN	EU	137641-05-5	30	15000	5,37	0,014	0,03	25	0,000025
PICOXYSTROBIN	EU	117428-22-5	20	898	3,6	0,046	0,043	2	41
PIPERONYL BUTOXIDE		51-03-6	14	687,88	4,75	0,2	0,2	10	0,24
PIRIMICARB	firm -> PestMan	23103-98-2	120	357	1,7	0,02	0,02	10	140
PIRIMIPHOS-METHYL		29232-93-7	30	1189,6	4,2	0,03	0,03	10	1
PROCHLORAZ	firm -> PestMan	67747-09-5	21	1463	4,12	0,01	0,01	10	0,1

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
PROCYMIDONE	firm -> PestMan	32809-16-8	56	310	3,14	0,1	0,1	10	
PROHEXADIONE-CALCIUM	EU	127277-53-6	8	82	-2,9	0,2	0,35	10	100
PROMETON		7287-19-6	50	381	3,1	0,04	0,04	10	0,02
PROMETRYN		7287-19-6	50	400	3,1	0,01	0,01	10	0,023
PROPACHLOR		1918-16-7	6,4	61,2	2,3	0,05	0,013	10	0,02
PROPAMOCARB HYDROCHLORIDE	firm -> PestMan	247-125-9	30	4187,94	-1,21	0,1	0,1	10	85
PROPAQUIZAFOP		111479-05-1	20	417,2	3,5	0,015	0,015	10	2,1
PROPAZINE		139-40-2	90	99,99	3,95	0,07	0,07	10	0,24
PROPETAMFOS		31218-83-4	60	4656,5	3,82	0,003	0,003	10	2,9
PROPHAM	EU	122-42-9	11	18,96	1,09	0,04	0,04	10	26
PROPICONAZOLE	EU	60207-90-1	214	382,7	3,72	0,04	0,1	2,4	0,093
PROPINEB	EU	12071-83-9	7,3	1000000	-0,26	0,007	0,003	1,37	2,68
PROPOXUR		114-26-1	79	27,584	1,56	0,02	0,03	81	5,3
PROPOXYCARBAZONE	EU	145026-81-9	13,8	28,8	-1,55	0,4	0,3	10	
PROPOXYCARBAZONE-SODIUM	EU	181274-15-7	60,6	28,8	-1,55	0,4	0,3	10	
PROPYZAMIDE	EU	23950-58-5	55,5	840	3	0,085	0,08	19	0,83
PROSULFOCARB	firm -> PestMan	52888-80-9	30,5	201,56	4,65	0,06	0,06	10	0,11
PROSULFURON	EU	94125-34-5	16,3	4	1,5	0,02	0,06	30	0,0089
PYMETROZINE	EU	123312-89-0	14	246	-0,19	0,03	0,03	6	21,6
PYRACLOSTROBIN	EU	175013-18-0	31,5	16000	3,99	0,03	0,015	1	0,843
PYRAFLUFEN-ETHYL	EU	129630-19-9	3	1994	3,49	0,2	0,112	56	0,00023
PYRAZOPHOS	EU	13457-18-6	39	648,2	3,8	0,004	0,0007	10	6,5
PYRETHRINS		8003-34-7	8	14,3	5,9	0,04	0,04	10	
PYRIDABEN		96489-71-3	55	10689	6,37	0,01	0,01	10	
PYRIDATE	EU	55512-33-9	5	20	0,5	0,036	0,036	10	2
PYRIFENOX		88283-41-4	66	453,4	3,7	0,02	0,02	10	0,095
PYRIMETHANIL	firm -> PestMan	53112-28-0	30,5	508	2,84	0,17	0,17	10	1,2
PYRIPROXYFEN	firm -> PestMan	95737-68-1	31	957,63	5,37	0,055	0,055	10	0,064
QUINMERAC	firm -> PestMan	90717-03-6	18	102	-1,11	0,08	0,08	10	48,5
QUINOXYFEN	EU	124495-18-7	374	22929	4,66	0,2	0,14	10	0,027
QUIZALOFOP-P-ETHYL	firm -> PestMan	100646-51-3	1	241,88	4,66	0,01	0,01	10	1,9
RIMSULFURON		122931-48-0	29	55,17	0,967	0,015	0,05	10	1,6
ROTENONE		83-79-4	2	1046,5	4,16	0,001	0,001	10	
SCILLIRIDOSE		507-60-8	88	103,44	6,25	0,01	0,01	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
SETHOXYDIM		74051-80-2	1,2	50	1,38	0,12	0,12	10	
SILTHIOPHAM	EU	175217-20-6	88	250,5	3,72	0,064	0,1	10	6,7
SILVERTHIOSULPHATE		NA 1890	37,19	5,25	0,32	0,32	0,32	10	
SIMAZINE	EU	122-34-9	64	79	2,1	0,005	0,006	10	0,042
S-METOLACHLOR	firm -> PestMan	87392-12-9	20,5	293	3,05	0,07	0,07	10	0,006
SODIUM CHLORATE		7775-09-9	180	65,28	1,84	0,01	0,01	10	
SODIUMDIKEGULAC		52508-35-7	195	0	1,35	2	2	10	
SPINOSAD		168316-95-8	25,21	2344,23	4	0,027	0,027	10	14
SPIROXAMINE	EU	118134-30-8	24,5	1135,77	382,1	0,025	0,024	18,5	0,003
STREPTOMYCIN		57-92-1	50,18	4187,94	4,35	1,25	1,25	10	
STRYCHINE SULPHATE		-5-2	88	97723,72	6,25	0,01	0,01	10	
SULCOTRIONE	firm -> PestMan	99105-77-8	6	492	-0,1	0,005	0,005	10	1,2
SULFOTEP		3689-24-5	28	463,8	3,99	0,00002	0,00017	10	7,2
SULPHOSULPHURON	EU	141776-32-1	24	5,3	-0,77	0,24	1	10	0,221
SULPHUR		7704-34-9	365	182,47	2,46	0,01	0,01	10	100
TCA		76-03-9	55	201,56	2,52	0,09	0,09	10	
TCMTB		21564-17-0	97	771,97	3,33	0,02	0,02	10	
TEBUCONAZOLE	firm -> PestMan	107534-96-3	17,5	771,97	3,7	0,03	0,03	10	4,01
TEBUFENOZIDE		112410-23-8	30	605,1	4,25	0,02	0,007	10	0,23
TEBUFENPYRAD	firm -> PestMan	119168-77-3	17,5	3155	5,04	0,007	0,007	10	
TECNAZENE	EU	117-18-0	7,3	1168,42	3,58	0,02	0,02	10	
TEFLUBENZURON	firm -> PestMan	83121-18-0	49	260,36	4,3	0,01	0,01	10	
TEFLUTHRIN	firm -> PestMan	79538-32-2	24	534664	6,4	0,005	0,005	10	1,05
TEMEPHOS		3383-96-8	2	766,5	3,9	0,016	0,016	10	
TEPRALOXYDIM		149979-41-9	5	241,88	2,63	0,027	0,027	10	76
TERBUFOS	firm -> PestMan	13071-79-9	18	1655,01	2,77	0,0002	0,0002	10	
TERBUTHYLAZINE	firm -> PestMan	5915-41-3	3,21	220	3,21	0,0022	0,0022	10	0,016
TERBUTRYN		886-50-0	32	672,4	3,5	0,02	0,02	10	0,0034
TETRACHLORVINPHOS		22248-79-9	2	1655,01	3,79	0,05	0,05	10	
TETRACONAZOLE		112281-77-3	40	915,4	3,53	0,01	0,01	10	
TETRADIFON		116-29-0	52	784,4	4,61	0,15	0,005	10	1
THALLIUMSULPHATE		7446-18-6	88	97723,72	6,25	0,01	0,01	10	
THIABENDAZOLE	EU	148-79-8	730	1812	2,39	0,1	0,1	10	9
THIACLOPRID	EU	111988-49-9	18	615	1,26	0,01	0,02	1	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
THIAMETHOXAM		153719-23-4	51	13,29	0,88	0,065	0,065	10	100
THIAMETURON-METHYL		79277-27-3	65,27	65,28	1,84	0,01	0,01	10	
THIOCYCLAM HYDROGEN OXALATE		31895-22-4	1	20,7	-0,07	0,035	0,035	10	
THIODICARB		59669-26-0	5,5	151,7	1,65	0,03	0,03	10	18
THIOFANOX		39196-18-4	4	17,2	1,76	0,005	0,005	10	
THIOFENSULFURON-METHYL	EU	79277-27-3	10	13	-1,7	0,01	0,07	10	0,0159
THIOMETON		640-15-3	2	762	3,15	0,003	0,0029	10	12,8
THIOPHANATE-METHYL	firm -> PestMan	23564-05-8	24,5	1,2	1,5	0,08	0,08	10	0,8
THIRAM	firm -> PestMan	137-26-8	0,5	250096	1,73	0,01	0,01	10	
TOLCLOFOS-METHYL	firm -> PestMan	57018-04-9	2	1168,42	4,56	0,07	0,07	10	
TOLYLFLUANIDE	firm -> PestMan	731-27-1	6,5	24,1	3,9	0,1	0,1	10	1
TRIADIMEFON		43121-43-3	55	378	3,11	0,03	0,03	10	1,71
TRIADIMENOL	firm -> PestMan	55219-65-3	242,5	771,97	3,08	0,05	0,05	10	3,7
TRI-ALLATE		2303-17-5	63	2006,7	4,06	0,025	0,05	10	0,12
TRIAPENTHENOL		76608-88-3	81	148,3	2,75	0,32	0,32	10	5,7
TRIASULFURON	EU	82097-50-5	21,3	7	-0,59	0,01	0,3	1	0,035
TRIAZAMATE		112143-82-5	0,1667	771,3	2,15	0,004	0,004	10	27
TRIAZOPHOS		24017-47-8	65	358,6	3,34	0,001	0,001	10	1,43
TRIAZOXIDE	firm -> PestMan	72459-58-6	1,7	4187,94	2,04	0,0005	0,0005	10	0,16
TRIBENURON-METHYL		101200-48-0	4	4,24	-0,44	0,012	0,012	10	0,0115
TRICHLORFON		52-68-6	18	19	0,43	0,01	0,01	10	10
TRICHLORONAT		327-98-0	49	1655,01	3,79	0,016	0,016	10	
TRICLOPYR		55335-06-3	20	55,2	0,68	0,3	0,05	10	3
TRICOSENE		27519-02-4	25,21	957,63	3,46	0,01	0,01	10	
TRIDEMORPH	firm -> PestMan	81412-43-3	24	6250	4,2	0,016	0,016	10	0,28
TRIFLOXYSTROBIN	EU	141517-21-7	6,85	2692,89	4,5	0,05	0,05	10	
TRIFLUMIZOLE		99387-89-0	19,5	2746,3	1,4	0,006	0,076	10	16
TRIFLURALIN		1582-09-8	94	6508,1	5,27	0,1	0,026	10	12,2
TRIFLUSULFURON-METHYL		126535-15-7	3	22,7	0,96	0,04	0,16	10	0,5
TRIFORINE		26644-46-2	19	143,1	2,4	0,02	0,02	10	380
TRINEXAPAC-ETHYL	firm -> PestMan	95266-40-3	24,5	370	1,6	0,316	0,316	10	
TRITICONAZOLE	firm -> PestMan	131983-72-7	292	771,97	3,29	0,0025	0,0025	10	1
VAMIDOTHION	firm -> PestMan	2275-23-2	1,5	1655,01	3,79	0,008	0,008	10	
VINCLOZOLIN	firm -> PestMan	50471-44-8	7	417,5	3	0,01	0,01	10	

active substance	endpoints	CASnr	DT50soil(d)	Koc	log Kow	ADI(mg/kg/d)	AOEL(mg/kg/d)	dermal abs (%)	EC50alg(mg/l)
WARFARIN		81-81-2	5	924,06	6	0,01	0,01	10	
ZETA-CYPERMETHRIN		52315-07-8	21	19898,4	2	0,05	0,05	10	
ZINEB	EU	12122-67-7	56	34,08	1,3	0,03	0,03	10	1,8
ZIRAM	firm -> PestMan	137-30-4	1,75	250096	1,23	0,003	0,003	10	
ZOXAMIDE	EU	156052-68-5	2,8	1224	3,76	0,5	0,3	1	0,011

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
2-(1-NAPHTHYL)ACETAMIDE		360		57		57	1000	0,057
2,3,6-TBA				100		100	1000	0,1
2,4,5-T		2		1,3		1,3	1000	0,0013
2,4-D	26,4	100	46,2	100	63,4	24,2	10	2,42
2,4-DB		25	3	3,5	63,4	1,1	50	0,022
2-NAPHTHYLOXYACETIC ACID								0,72
4-INDOL-3-YLBUTYRIC ACID	32	180		146		32	1000	0,032
8- HYDROXYQUINOLINE SULFATE								0,01
ABAMECTIN		0,00034		0,0032		0,00034	1000	0,00000034
ACEPHATE	500	57	43	175		43	50	0,86
ACETAMIPRID		49,8	5	100	19,2	5	50	0,1
ACIBENZOLAR-S-METHYL	0,5	2,4	0,044	0,4	0,026		0	0,01
ACLONIFEN		2,5		0,67		0,0069	1000	0,0000069
ACRINATHRIN	930	0,31		0,026		0,026	1000	0,000026
ALACHLOR	0,03	10		1,8		0,03	1000	0,00003
ALDICARB		0,41	0,25	0,56	0,03	0,03	50	0,0006
ALFA-CYPERMETHRIN	1,3	0,0003	0,00003	0,0028	0,00003	0,00003	10	0,000003
ALLETHRIN				0,134		0,134	1000	0,000134
ALLOXYDIM-SODIUM	18	4000		2000		18	1000	0,018
ALUMINIUM PHOSPHIDE								0,0035
AMIDOSULFURON		36		320		36	1000	0,036
AMITRAZ		1,05		0,45		0,45	1000	0,00045
AMITROLE	2,3	6,1	0,32	1000	100	0,32	10	0,032
AMMONIUM GLUPHOSINATE		560		710		37	1000	0,037
ANILAZINE	1	0,97		0,15		0,15	1000	0,00015
ANTHRAQUINONE		10		72		10	1000	0,01
ASULAM				1700		1700	1000	1,7
ATRAZINE		5,29	0,04	3,96	0,06	0,043	50	0,0009
AZACONAZOLE		86		42		42	1000	0,042
AZAMETHIPHOS		0,00067		0,115		0,00067	1000	0,00000067
AZIMSULFURON	0,003	941	5,4	154	6,3	0,003	10	0,0003
AZINPHOS-ETHYL		0,0002		0,08		0,0002	1000	0,0000002
AZINPHOS-METHYL	1,8	0,0011	0,00025	0,003	0,00023	0,00023	10	0,000023
AZOCYCLOTIN		0,04		0,004		0,004	1000	0,000004

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
AZOXYSTROBIN	0,044	0,28	0,044	0,47	0,16	0,044	10	0,0044
Bacillus thuringiensis		25		156		25	1000	0,025
BENALAXYL		0,59	0,03	3,75	0,49	0,03	50	0,0006
BENAZOLIN	1	6,2	0,05	5,4		0,05	50	0,001
BENDIACARB	0,32	0,16		1,55		0,16	1000	0,00016
BENFLURALIN		2,18		0,081		0,081	1000	0,000081
BENFURACARB		10		0,65		0,65	1000	0,00065
BENOMYL		0,64		0,27		0,27	1000	0,00027
BENQUINOX								0,01
BENSULTAP	0,25	0,21		0,79		0,79	1000	0,00079
BENTAZON	25,7	64	120	100	48	10,1	10	1,01
BENZOXIMATE				1,75		1,75	1000	0,00175
BENZOYLPROP-ETHYL								0,15
BETA-CYFLUTHRIN		0,00029	0,00002	0,000068	0,00001	0,00001	50	0,0000002
BIFENOX	0,0032	16,3		0,47		0,0032	1000	0,0000032
BIFENTHRIN	10	0,00011		0,00035		0,00011	1000	0,00000011
BINAPACRYL								0,00013
BIOALLETHRIN		0,0356		0,0094		0,0094	1000	0,0000094
BIORESMETHRIN		0,0008		0,00062		0,00062	1000	0,00000062
BITERTANOL		1,8		2,14		1,8	1000	0,0018
BOSCALID		5,33		2,7		2,7	100	0,027
BRODIFACOUM		0,34		0,051		0,051	1000	0,000051
BROMACIL		119		75		75	1000	0,075
BROMADIOLONE		2		1,4		1,4	1000	0,0014
BROMOCYCLEN								0,021
BROMOFENOXIM	0,8	1,6		0,18		0,18	1000	0,00018
BROMOPHOS								0,015
BROMOPHOS-ETHYL	0,1	0,0086		0,18		0,0086	1000	0,0000086
BROMOPROPYLATE	0,42	0,17		4		0,17	1000	0,00017
BROMOXYNIL		12,5		29,2		0,12	1000	0,00012
BROMUCONAZOLE		5		1,7		1,7	1000	0,0017
BUMINAFOS		18		5,6		1,4	1000	0,0014
BUPIRIMATE	0,5	7,3		1		0,5	1000	0,0005
BUPROFEZIN	2,1	3,2	0,09	2,4		0,09	50	0,0018

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
BUTRALIN		0,12		0,37		0,12	1000	0,00012
BUTYLATE				4,2		4,2	1000	0,0042
CAPTAFOL		3,34		0,5		0,5	1000	0,0005
CAPTAN	0,2	4,7	0,56	0,045	0,056	0,045	10	0,0045
CARBARYL		0,006		1,3		0,0006	1000	0,000006
CARBENDAZIM		0,13		0,61		0,13	1000	0,00013
CARBETAMIDE	0,14	50		100		0,14	1000	0,00014
CARBOFURAN		38,6		0,0073		0,0073	1000	0,000073
CARBOSULFAN		0,0015		0,045		0,0015	1000	0,000015
CARBOXIN		84,4		1,2		0,48	1000	0,00048
CARFENTRAZONE-ETHYL		9,8	0,22	1,6	0,11	0,012	50	0,00024
CHLORBROMURON		5,8		5		0,017	1000	0,000017
CHLORBUFAM								0,011
CHLORFACINON								0,0035
CHLORFENVINPHOS	0,25	0,0002	0,0003	1,1	0,038	0,0002	10	0,00002
CHLORIDAZON		132		32		1,9	1000	0,0019
CHLORMEQUAT		31,7	2,78	2147	100	2,78	50	0,0556
CHLORMEQUAT CHLORIDE		31,7		100		31,7	1000	0,0317
CHLOROPICRINE		0,91		0,168		0,168	1000	0,000168
CHLOROXYURON	0,0063	4,3		0,27		0,0063	1000	0,000063
CHLORPROPHAM	0,32	2,6	1	5,3	0,32	0,32	10	0,032
CHLORPYRIPHOS	0,027	0,0001	0,0001	0,003		0,0001	50	0,000002
CHLORPYRIPHOS-METHYL		0,016		0,41		0,016	1000	0,000016
CHLORTHALONIL		0,07		0,047		0,047	1000	0,000047
CHLORTIAMID				41		41	1000	0,041
CHLORTOLURON	0,01	67		20		0,01	1000	0,00001
CINIDON-ETHYL		59,2	0,11	200	1	0,021	50	0,00042
CLETHODIM		120	60	67		57,8	100	0,578
CLODINAFOP-PROPARGYL		74		0,39		0,39	1000	0,00039
CLOFENTEZINE	0,0025	0,015	0,015	0,015	0,007	0,0025	10	0,00025
CLOMAZONE		5,2		19		2,1	1000	0,0021
CLOPYRALID	4	225	17	125	124	4	10	0,4
CLOQUINTOCET-MEXYL		100		76		0,63	1000	0,00063
Coniothyrium minitans								0,01

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
COPPER(HYDROXIDE)		0,85		0,3		0,3	1000	0,0003
COPPEROXYCHINOLATE								0,0008
COPPEROXYCHLORIDE		3,5		7,6	0,18	0,18	100	0,0018
COUMAPHOS								0,021
CUMATETRALYL		14		48		14	1000	0,014
CUPRIC SULPHATE		0,85		0,3		0,3	1000	0,0003
CYANAMIDE	1	6,5		88		1	1000	0,001
CYANAZINE		42		16		0,1	1000	0,0001
CYAZOFAMIDE		0,19	0,11	0,56	0,13	0,025	50	0,0005
CYCLANILIDE	0,5	13	12,6	11	2,6	0,5	10	0,05
CYCLOATE		5,6		4,5		4,5	1000	0,0045
CYCLOXYDIM		132		100		100	1000	0,1
CYCLURON								0,047
CYFLUTHRIN	0,1	0,00016	0,00002	0,00047	0,00001	0,00001	10	0,000001
CYHALOFOP-BUTYL	10	2,7	100	0,789	0,308	0,308	10	0,0308
CYHALOTHRIN		0,00038		0,00054		0,00038	1000	0,00000038
CYHEXATIN	10	0,0063		0,0055		0,0055	1000	0,0000055
CYMAZOL								0,021
CYMOXANIL	0,625	30		81	0,5	0,5	50	0,01
CYPERMETHRIN		0,000015		0,000069		0,000015	1000	0,000000015
CYPROCONAZOLE		26		18,9		18,9	1000	0,0189
CYPRODINIL		0,033		2,41		0,033	1000	0,000033
CYROMAZINE		7,1		90		7,1	1000	0,0071
DALAPON		800		345		345	1000	0,345
DAMINOZIDE	1	98,5		580		1	1000	0,001
DAZOMET		0,3		0,16		0,16	1000	0,00016
DELTAMETHRIN		0,56	0,0000041	0,00026	0,000032	0,0000041	50	0,000000082
DEMETON-S-METHYL		0,023		6,4		0,023	1000	0,000023
DEMETON-S-METHYL SULPHON	10	35,4		54,6		10	1000	0,01
DESMEDIPHAM	0,05	0,45	0,01	0,25		0,01	50	0,002
DESMETRYN		45		2,2		0,004	1000	0,000004
DIALATE				7,9		7,9	1000	0,0079
DIAZINON	10	0,0015		0,13		0,0015	1000	0,0000015
DICAMBA		110		135		41	1000	0,041

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
DICHOLOBENIL		13		4,2		4,2	1000	0,0042
DICHLOFENTHION				0,39		0,39	1000	0,00039
DICHOFLUANID	1	1,8		0,05		0,05	1000	0,00005
DICHLORMID		161		141		141	1000	0,141
DICHLORO-1,3-PROPENE		6,2		9		5	1000	0,005
DICHLOROPHEN								0,01
DICHLORPROP-P		100		100		100	1000	0,1
DICHLORVOS	4,73	0,00019		1,4		0,00019	1000	0,00000019
DICLOBUTRAZOL								0,01
DICLORAN		2,1		1,6		1,6	1000	0,0016
DICOFOL	0,05	0,075		0,52		0,05	1000	0,00005
DIENOCHELOR	0,0047	0,1		0,05		0,0047	1000	0,0000047
DIETHATYL-ETHYL		18,8		1,82		1,82	1000	0,00182
DIETHOFENCARB		10		18		10	1000	0,01
DIETHYL-TOLUAMIDE (DEET)								0,01
DIFENACOUM		0,52		0,1		0,1	1000	0,0001
DIFENOCONAZOLE		0,77		0,81		0,032	1000	0,000032
DIFENOXURON	0,01	79		10,7		0,01	1000	0,00001
DIFENZOQUAT		2,63		694		2,63	1000	0,00263
DIFETHIALONE		0,0044		0,051		0,0044	1000	0,0000044
DIFLUBENZURON	0,2	0,0057	0,00004	0,184		0,00004	50	0,0000008
DIFLUFENICAN		10		56		10	1000	0,01
DIMEFURON		244		1000		0,0083	1000	0,0000083
DIMETHENAMID		16		2,6		0,062	1000	0,000062
DIMETHENAMID-P		12		6,3	2,5	0,017	100	0,00017
DIMETHIPIN		21,3		52,8		5,12	1000	0,00512
DIMETHOATE	30,5	2	1	17,6		1	50	0,02
DIMETHOMORPH		10,6		6,2		6,2	1000	0,0062
DINICONAZOLE				1,58		1,58	1000	0,00158
DINOCAP		0,075		0,015		0,015	1000	0,000015
DINOSEB								0,0000034
DINOTERB	1	0,47		0,0034		0,0034	1000	0,0000034
DIQUAT	0,32	1,2	0,125	6,1	0,12	0,011	10	0,0011
DIQUAT DIBROMIDE	0,32	1,2	0,125	6,1	0,12	0,011	10	0,0011

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
DITHIANON		2,4		0,1		0,1	1000	0,0001
DIURON		12		5,6		5,6	1000	0,0056
DNOC	3,2	5,7		4		3,2	1000	0,0032
DODEMORPH	5,3	3,3		22		3,3	1000	0,0033
DODINE	0,003	0,062		0,7		0,003	1000	0,000003
ENDOSULFAN		0,075		0,002		0,002	1000	0,000002
ENDOTHAL-SODIUM		92		49		49	1000	0,049
ENILCONAZOLE								0,011
EPOXICONAZOLE		8,7		2,2		2,2	1000	0,0022
EPTC	0,5	15,4		12		0,5	1000	0,0005
ESFENVALERATE	0,001	0,0009	0,00001	0,0001	0,00025	0,00001	10	0,000001
ETHEPHON		1000		140		32	1000	0,032
ETHIOFENCARB		0,22		3,4		0,22	1000	0,00022
ETHION				0,52		0,52	1000	0,00052
ETHIRIMOL		53		66		53	1000	0,053
ETHOFUMESATE		14	0,32	11	0,8	0,32	50	0,0064
ETHOPROPHOS				2,1		2,1	1000	0,0021
ETHOXYLSULFURON		307	1	80	22,8	0,19	50	0,0038
ETOFENPROX		210		0,072		0,072	1000	0,000072
ETRIDIAZOLE		3,1		2,4		0,072	1000	0,000072
ETRIMFOS	0,4	0,0037		0,1		0,0037	1000	0,0000037
FAMOXADONE		0,012	0,0037	0,011	0,0014	0,0014	50	0,000028
FENAMIDONE		0,053	0,0125	0,41	0,31	0,0125	50	0,00025
FENAMINOSULF	10	14,4		67		10	1000	0,01
FENAMIPHOS	0,32	0,0016		0,01		0,0016	1000	0,0000016
FENARIMOL	0,59	0,18	0,113	0,82	0,43	0,113	10	0,0113
FENAZAQUIN		0,0041		0,0038		0,0038	1000	0,0000038
FENBUCONAZOLE				0,68		0,68	1000	0,00068
FENBUTATIN-OXYDE		0,05		0,27		0,005	1000	0,000005
FENCHLORAZOLE-ETHYL		1,8		0,29		0,29	1000	0,00029
FENHEXAMID		18,8	1	1,34	0,101	0,101	50	0,00202
FENITROTHION	0,1	0,0016		2		0,0016	1000	0,0000016
FENOXAPROP-P-ETHYL		0,56		0,46		0,46	1000	0,00046
FENOXYCARB		0,4		1,6		0,4	1000	0,0004

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
FENPICLONIL	0,1	1,3		0,76		0,1	1000	0,0001
FENPROPATHRIN	2	0,00053		0,0018		0,00053	1000	0,00000053
FENPROPIDIN		0,5		1,9		0,0025	1000	0,0000025
FENPROPIMORPH		2,24		1,74		1	1000	0,001
FENPYROXIMATE		0,085		0,006		0,006	1000	0,000006
FENTHION		0,0057		0,8		0,0057	1000	0,0000057
FENTIN ACETATE		0,01	0,0001	0,0071	0,00015	0,0001	50	0,000002
FENTIN HYDROXIDE	0,01	0,011		0,01	0,009	0,002	50	0,00004
FENURON				610		610	1000	0,61
FENVALERATE	10	0,00003		0,00064		0,00003	1000	0,00000003
FERBAM		0,09		10,02		0,09	1000	0,00009
FERRIC PHOSPHATE							0	0,0735
FIPRONIL		0,19		0,085		0,068	1000	0,000068
FLAZASULFURON	0,005	106	6,25	22	5	0,005	10	0,0005
FLOCOUAFEN		0,66		0,15		0,15	1000	0,00015
FLORASULAM		292	38,9	100	119	0,00894	50	0,0001788
FLUAZIFOP-P-BUTYL		1		1,3		0,51	1000	0,00051
FLUAZINAM	0,048	0,055		0,11	0,012	0,012	50	0,00024
FLUBENZIMINE								2,84
FLUCYCLOXURON	0,0022	0,00027	0,000016	100	0,33	0,000016	10	0,0000016
FLUCYTHRANATE		0,0083		0,00032		0,00032	1000	0,00000032
FLUDIOXONIL		1,1		0,31		0,092	1000	0,000092
FLUFENACET		30,9	3,26	2,13	0,2	0,00204	50	0,0000408
FLUFENOXURON		0,00004		0,0049		0,00004	1000	0,00000004
FLUMEQUINE								0,15
FLUMIOXAZINE		5,9	0,057	2,3	0,37	0,000852	50	0,0000174
FLUORODIFEN								0,15
FLUOROGLYCOFEN-ETHYL		30		23		23	1000	0,023
FLUPOXAM								0,028
FLUPYRSULFURON-METHYL		721	16	470	130	0,0037	50	0,000074
FLUQUINCONAZOLE		5		1,34		0,014	1000	0,000014
FLUROCHLORIDONE		5,1		3		0,0064	1000	0,0000064
FLUROXYPYR		100	56	14,3	100	12,3	10	1,23
FLUROXYPYR-MEPTYL		0,2	0,1		0,2	0,1	1000	0,0001

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
FLURPRIMIDOL		11,8		18,3		0,84	1000	0,00084
FLURTAMONE		130	0,071	7	0,63	0,02	50	0,0004
FLUSILAZOLE	1	3,4		1,2		1	1000	0,001
FLUTOLANIL	0,56	50,6		2,4	0,46	0,46	50	0,0092
FLUTRIAFOL		78		61	6,2	6,2	100	0,062
FLUVALINATE	10	0,001		0,00089		0,00089	1000	0,0000089
FOLPET		0,02		0,1		0,02	1000	0,00002
FONOFOS	0,5	0,0023		0,028		0,0023	1000	0,0000023
FORAMSULFURON		100	100	100	100	3,3	50	0,066
FORMETANATE		0,093		4,42		0,093	1000	0,000093
FORMOTHION	5,5	16,1		38,3		5,5	1000	0,0055
FOSETYL		100		173,2		0,014	1000	0,000014
FOSETYL-ALLUMINIUM		100		173,2		21,9	1000	0,0219
FOSTHIAZATE		0,282	0,06	114	7,8	0,06	50	0,0012
FOXIM		0,00081		0,53		0,00081	1000	0,0000081
FUBERIDAZOLE		4,7		0,91		0,91	1000	0,00091
FURATHIOCARB		0,0016		0,028		0,0016	1000	0,0000016
GLUFOSINATE AMMONIUM		560		710		37	1000	0,037
GLYPHOSATE	72,9	930	455	1000	917	72,9	10	7,29
GLYPHOSATE-TRIMESIUM							0	7,29
GRANULOSEVIRUS		250		250		250	1000	0,25
GUAZATINE		0,15		1,41		0,15	1000	0,00015
GUAZATINE TRIACETATE		0,15		1,41		0,15	1000	0,00015
HALFENPROX		0,000031		0,0035		0,000031	1000	0,000000031
HALOXYFOP-ETOTYL		4,64		0,284		0,284	1000	0,000284
HALOXYFOP-R-METHYL	2,44	12,3	9,6	0,0884	0,86	0,0884	10	0,00884
HEPTENOPHOS	25	0,002		9,3		0,002	1000	0,000002
HEXACONAZOLE		2,9		3,4		2,9	1000	0,0029
HEXAZINONE		442		274		274	1000	0,274
HEXYTHIAZOX		1,2		3,7		1,2	1000	0,0012
HYDROQUINOLINE SULFATE								0,00263
HYMEXAZOL	29	28		460		28	1000	0,028
IMAZALIL		3,5		1,48		0,87	1000	0,00087
IMAZAMETHABENZ-METHYL		100		100		100	1000	0,1

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
IMAZAMOX		122	137	119	122	0,037	50	0,00074
IMAZAPYR		100		100		100	1000	0,1
IMAZAQUIN		280		280		0,09	1000	0,00009
IMAZETHAPYR	50	1000		340		50	1000	0,05
IMIDACLOPRID		85		211		85	1000	0,085
INDOL-3-YLACETIC ACID	32	180		146		32	1000	0,032
INDOXACARB								0,021
IODOFENPHOS								0,021
IODOSULPHURON		100		1000		0,07	1000	0,00007
IOXYNIL		3,14		0,64	3,2	0,15	100	0,0015
IPRODIONE	3,2	0,66	0,17	3,1	0,26	0,17	10	0,017
IPROVALICARB							0	0,01
ISOCARBAMID								0,15
ISOFENPHOS	5,7	0,005		1,4		0,005	1000	0,000005
ISOPROTURON	0,0032	0,58	0,12	18	1	0,0032	10	0,00032
ISOXABEN	1,4	1,3	0,69	1,1	0,4	0,4	10	0,04
ISOXAFLOTOL	0,016	1,5	0,35	1,7	0,08	0,016	10	0,0016
KRESOXIM-METHYL	0,003	0,186	0,032	0,15	0,02	0,003	10	0,0003
LAMBDA-CYHALOTHRIN	0,000016	0,000016	0,000006	0,00021	0,00025	0,000006	10	0,000006
LENACIL	0,01	33		10		0,01	1000	0,00001
LINDANE	1,9	0,0195		0,002		0,002	1000	0,000002
LINURON	0,01	0,31	0,18	3,15	0,1	0,01	10	0,001
MAGNESIUM FOSFIDE								0,0256
MALATHION		0,001		0,062		0,001	1000	0,000001
MALEIC HYDRAZIDE	9,84	1000	0,95	1608		0,95	50	0,019
MANCOZEB		0,47		2,1		0,16	1000	0,00016
MANEB	0,06	0,31	0,056	0,2	0,056	0,056	10	0,0056
MCPA	56	1100		2000	50	50	50	1
MCPB		55		4,3		0,42	1000	0,00042
MECARBAM								0,015
MECOPROP		200	22	240	109	22	50	0,44
MECOPROP-P	27	91	22,2	100	50	16,2	10	1,62
MEFENPYR-DIETHYL		53		2,4		1,65	1000	0,00165
MEFLUIDIDE				100		100	1000	0,1

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
MEPANIPYRIM	1,2	0,63	0,031	0,74	0,029	0,031	10	0,0031
MEPIQUAT CHLORIDE		68,5		4300		68,5	1000	0,0685
MEPRONIL		10		10		10	1000	0,01
MESOSULFURON-METHYL		100	1,8	100	32	0,2	50	0,004
MESOTRIONE		900	180	120	12,5	3,5	50	0,07
METALAXYL	10	610		100	72	10	50	0,2
METALAXYL-M		100	1,2	100	9,1	1,2	50	0,024
METALDEHYDE		90		100		73,5	1000	0,0735
METAMITRON	0,1	100		440		0,1	1000	0,0001
METAM-SODIUM		2,3		0,39		0,39	1000	0,00039
METAZACHLOR		22		4		1,63	1000	0,00163
METCONAZOLE		4,2		2,2		1,7	1000	0,0017
METHABENZTHIAZURON	0,018	30,6		16		0,018	1000	0,000018
METHAMIDOPHOS	18	0,026		46		0,026	1000	0,000026
METHIDATHION	10	0,0072	0,0005	0,0022	0,0006	0,0006	10	0,00006
METHIOCARB		0,019		0,436		0,019	1000	0,000019
METHOMYL	6,3	0,0088	0,0015	0,48	0,073	0,0015	10	0,00015
METHOXYCHLOR		0,00078		0,052		0,00078	1000	0,0000078
METHYL BROMIDE		1,7		0,8		0,8	1000	0,0008
METHYL ISOTHIOCYANATE	0,125	0,055	0,016	0,09	0,005	0,005	10	0,0005
METIRAM		0,11		0,33		0,11	1000	0,00011
METOBROMURON		44		43		0,26	1000	0,00026
METOSULAM						0,075	1000	0,000075
METOXURON		215,6		18,9		18,9	1000	0,0189
METRIBUZIN		49,6		74,6		0,021	1000	0,000021
METSULFURON-METHYL	6,25	150	150	150	68	0,045	10	0,0045
MEVINPHOS	50	0,0015		0,013	0,0057	0,0015	50	0,00003
MOLINATE		14,9	0,38	16	0,39	0,22	50	0,0044
MONALIDE								0,15
MONOLINURON		32		74		0,001	1000	0,000001
MONURON								0,15
MYCLOBUTANIL	0,14	1,4	0,88	2	0,98	0,14	10	0,014
NAPROPAMIDE		24		16,6		16,6	1000	0,0166
NEBURON				0,6		0,6	1000	0,0006

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
NICOSULFURON	100	1000		1000		100	1000	0,1
NITROFEN								0,15
NITROTHALE-ISOPROPYL	0,19	2,8		0,56		0,19	1000	0,00019
NUARIMOL		8		5,6		2,5	1000	0,0025
OFURACE		46		29		29	1000	0,029
OMETHOATE		0,021	0,0021	20		0,0021	100	0,000021
OXADIARGYL	0,045	352	27	201	24	0,045	10	0,0045
OXADIAZON		2,4		1,2		0,006	1000	0,000006
OXADIXYL		530		320		46	1000	0,046
OXAMYL	0,21	5,6		2,6	0,77	0,21	50	0,0154
OXASULFURON		89,4	14	111	114	0,145	50	0,0029
OXYCARBOXIN		69,1		19,9		19	1000	0,019
OXYDEMETON	100	0,0033		1,9		0,0033	1000	0,0000033
OXYDEMETON-METHYL	100	0,0033		1,9		0,0033	1000	0,0000033
PACLOBUTRAZOL		33,2		27,8	3,3	8	100	0,08
Paecilomyces fumosoroseus var. apopka								
PARAQUAT		4,4	0,12	19		0,00023	100	0,0000023
PARATHION	0,015	0,0008		0,48		0,0008	1000	0,0000008
PARATHION-METHYL		0,0048		9,4		0,0048	1000	0,0000048
PENCONAZOLE		7		1,7		0,83	1000	0,00083
PENCYCURON		0,27		127		0,27	1000	0,00027
PENDIMETHALIN	0,003	0,28	0,0145	0,138	0,006	0,003	10	0,0003
PERMETHRIN	0,00087	0,0002		0,00067		0,0002	1000	0,0000002
PHENMEDIPHAM	0,02	0,41	0,025	1,71	0,4	0,02	10	0,002
PHOSALONE	0,1	0,000739		0,55		0,000739	1000	0,000000739
PHOSFAMIDONE	70	0,022		3,2		0,022	1000	0,0000022
PHOSMET		0,0024		0,022		0,0024	1000	0,0000024
PICLORAM		34,4		5,5		5,5	1000	0,0055
PICOLINAFEN		0,45	0,007	0,68	0,0064	0,000025	50	0,0000005
PICOXYSTROBIN		20	8	55	10	8	50	0,16
PIPERONYL BUTOXIDE		8		4,5		0,24	1000	0,00024
PIRIMICARB		0,017		55		0,017	1000	0,000017
PIRIMIPHOS-METHYL		0,00012		0,24		0,00012	1000	0,00000012
PROCHLORAZ		4,3		1,5		0,1	1000	0,0001

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
PROCYMIDONE				7,2		7,2	1000	0,0072
PROHEXADIONE-CALCIUM		100	100	100	100	100	50	2
PROMETON		18,9		2,9		0,02	1000	0,00002
PROMETRYN		12,66		5,5		0,023	100	0,00023
PROPACHLOR	0,015	7,8	0,1	0,17	0,02	0,015	10	0,0015
PROPAMOCARB HYDROCHLORIDE		106		92		85	1000	0,085
PROPAQUIZAFOP	2,1	2,1		0,19		0,19	1000	0,00019
PROPAZINE	0,07	17,7		17		0,07	1000	0,00007
PROPETAMFOS		0,0145		4,6		0,0145	1000	0,0000145
PROPHAM	0,32	23		36		0,32	1000	0,00032
PROPICONAZOLE		0,51	0,31	2,6	0,068	0,068	50	0,00136
PROPINEB		4,7	0,026	0,4	0,1	0,026	50	0,00052
PROPOXUR	1	0,15	0,023	3,7	1,4	0,023	10	0,0023
PROPOXYCARBAZONE	1,57	100	110	77,6	105	1,57	50	0,03
PROPOXYCARBAZONE-SODIUM	1,57	100	110	77,6	105	1,57	50	0,03
PROPYZAMIDE	2	5,6	0,6	4,7	0,94	0,6	10	0,06
PROSULFOCARB		1,3		1,7		0,11	1000	0,00011
PROSULFURON		120	148	160	5,8	0,0089	50	0,000178
PYMETROZINE		87	0,025	100	11,7	0,025	50	0,0005
PYRACLOSTROBIN		0,016	0,004	0,006	0,005	0,004	50	0,00008
PYRAFLUFEN-ETHYL		0,1	100	0,1	10	0,00023	50	0,0000046
PYRAZOPHOS	65,5	0,00036	0,00018	0,016		0,00018	50	0,0000036
PYRETHRINS		0,0022		0,0034		0,0022	1000	0,0000022
PYRIDABEN	1	0,00059		0,0029		0,00059	1000	0,00000059
PYRIDATE	48	0,83	0,01	1,2	0,08	0,01	10	0,001
PYRIFENOX	0,001	3,6		6,6		0,001	1000	0,000001
PYRIMETHANIL		2,9		10,6		1,2	1000	0,0012
PYRIPROXYFEN		0,4		0,325		0,064	1000	0,000064
QUINMERAC		148,7		86,8		48,5	1000	0,0485
QUINOXYFEN		0,08	0,0278	0,27	0,014	0,027	50	0,00054
QUIZALOFOP-P-ETHYL		0,29		0,5		0,29	1000	0,00029
RIMSULFURON	0,625	360	0,82	390	140	0,625	10	0,0625
ROTENONE		0,002		0,0019	0,0021	0,0019	100	0,000019
SCILLIRIDOSE								0,0035

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
SETHOXYDIM		120		30		30	1000	0,03
SILTHIOPHAM		14	0,47	11		0,47	100	0,0047
SILVERTHIOSULPHATE								0,72
SIMAZINE		100	0,036	42,33	3,4	0,036	50	0,00072
S-METOLACHLOR		11,2		1,2		0,006	1000	0,000006
SODIUM CHLORATE				4200		4200	1000	4,2
SODIUMDIKEGULAC				10000		10000	1000	10
SPINOSAD		0,09		3,5		0,09	100	0,0009
SPIROXAMINE		6,1	0,1	7,13	0,014	0,003	50	0,00006
STREPTOMYCIN								0,01
STRYCHINE SULPHATE								0,0035
SULCOTRIONE		200		227		1,2	1000	0,0012
SULFOTEP		0,002		0,0016		0,0016	1000	0,0000016
SULPHOSULPHURON		96	102	91	100	0,221	50	0,00442
SULPHUR		1000		180		100	1000	0,1
TCA				11000		11000	1000	11
TCMTB								0,011
TEBUCONAZOLE		4,2		4,4		4,01	1000	0,00401
TEBUFENOZIDE		3,8		5,7		0,23	1000	0,00023
TEBUFENPYRAD		1,2		0,073		0,073	1000	0,000073
TECNAZENE		0,58		0,37		0,37	1000	0,00037
TEFLUBENZURON				500		500	1000	0,5
TEFLUTHRIN		70000		60000		1,05	1000	0,00105
TEMEPHOS	0,01	0,5		8		0,01	1000	0,00001
TEPRALOXYDIM		100		100		76	1000	0,076
TERBUFOS				0,004		0,004	1000	0,000004
TERBUTHYLAZINE		21		3,8		0,016	1000	0,000016
TERBUTRYN		2,7		2,8		0,0034	1000	0,0000034
TETRACHLORVINPHOS				0,3		0,3	1000	0,0003
TETRACONAZOLE		3		4,8		3	1000	0,003
TETRADIFON	0,1	0,11	0,1	2	0,1	0,1	10	0,01
THALLIUMSULPHATE								0,0035
THIABENDAZOLE	3,2	0,81	0,042	0,55	0,012	0,012	10	0,0012
THIACLOPRID							0	0,084

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
THIAMETHOXAM		100		100		100	1000	0,1
THIAMETURON-METHYL								0,15
THIOCYCLAM HYDROGEN OXALATE	3,3	2,01		0,051		0,051	1000	0,000051
THIODICARB	3,2	0,05		1,21		0,05	1000	0,00005
THIOFANOX				0,13		0,13	1000	0,00013
THIOFENSULFURON-METHYL		470	100	100	250	0,0159	50	0,000318
THIOMETON	5	8,2		8		5	1000	0,005
THIOPHANATE-METHYL		20,2		7,8		0,8	1000	0,0008
THIRAM		0,21		0,0445		0,0445	1000	0,0000445
TOLCLOFOS-METHYL				720000		720000	1000	720
TOLYLFLUANIDE		0,57		0,05		0,05	1000	0,00005
TRIADIMEFON	0,1	11,3	0,087	17,4	3,4	0,087	10	0,0087
TRIADIMENOL		51		14		3,7	1000	0,0037
TRI-ALLATE	0,032	0,43		1,2		0,032	1000	0,000032
TRIAPENTHENOL	3,2	100		10		3,2	1000	0,0032
TRIASULFURON	0,032	100	10	100	36,6	0,032	10	0,0032
TRIAZAMATE	9,7	0,014		0,53		0,53	50	0,011
TRIAZOPHOS	0,1	0,003		0,041		0,003	1000	0,000003
TRIAZOXIDE		4,8		0,63		0,16	1000	0,00016
TRIBENURON-METHYL		720		1000		0,0115	1000	0,000115
TRICHLORFON	3,2	0,00096		1,6		0,00096	1000	0,0000096
TRICHLORONAT				0,14		0,14	1000	0,00014
TRICLOPYR	3	2,9	1,4	0,65	28	0,65	10	0,065
TRICOSENE								0,021
TRIDEMORPH		1,3		3,4		0,28	1000	0,00028
TRIFLOXYSTROBIN		0,016		0,015		0,015	1000	0,000015
TRIFLUMIZOLE	16	1,4		0,57		0,57	1000	0,00057
TRIFLURALIN	5,37	0,245	0,051	0,088		0,051	50	0,00102
TRIFLUSULFURON-METHYL	0,13	460	11	730		0,13	50	0,0026
TRIFORINE		117		1000		117	1000	0,117
TRINEXAPAC-ETHYL		142		35		35	1000	0,035
TRITICONAZOLE		9,3		10		1	1000	0,001
VAMIDOTHION		0,19		10		0,19	1000	0,00019
VINCLOZOLIN		4		22		4	1000	0,004

active substance	NOECalg(mg/l)	LC50cru(mg/l)	NOECcru(mg/l)	LC50fish(mg/l)	NOECfish(mg/l)	LowestTOXaq(mg/l)	Safety factor	MTC(mg/l)
WARFARIN	8,5	180		65		8,5	1000	0,0085
ZETA-CYPERMETHRIN		0,00015		0,00069		0,00015	1000	0,00000015
ZINEB		0,97		2		0,97	1000	0,00097
ZIRAM		0,048		1,9		0,048	1000	0,000048
ZOXAMIDE		0,78	0,039	0,16	0,00348	0,00348	50	0,0000696

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
2-(1-NAPHTHYL)ACETAMIDE	1577	20060	10680	growth regulator	Synthetic auxin	
2,3,6-TBA	1500	100	551	herbicide	Benzoic acid	HRAC-O
2,4,5-T	200	100	551	herbicide	Phenoxyacetic acid	HRAC-O
2,4-D	500	94	350	herbicide	Phenoxyacetic acid	HRAC-O
2,4-DB	1545	100	1000	herbicide	Phenoxyacetic acid	HRAC-O
2-NAPHTHYLOXYACETIC ACID	1577	20060	10680	growth regulator	Synthetic auxin	
4-INDOL-3-YLBUTYRIC ACID	1577	20060	10680	growth regulator	Auxin	
8- HYDROXYQUINOLINE SULFATE	1042	1745	552	fungicide	Sulfate	
ABAMECTIN	85	0,0022	28	insecticide	Avermectin	IRAC-6
ACEPHATE	140	1,2	22974	insecticide	Organophosphate	IRAC-1B
ACETAMIPRID	98	8,09	18,3	insecticide	Neonicotinoid	IRAC-4A
ACIBENZOLAR-S-METHYL	1042	100	1000	fungicide	Benzothiadiazole	FRAC-P1
ACLONIFEN	15000	100	300	herbicide	Diphenyl ether	HRAC-F3
ACRINATHRIN	1000	0,2	1000	insecticide	Pyrethroid	IRAC-3
ALACHLOR	1563	32	387	herbicide	Chloroacetamide	HRAC-K3
ALDICARB	1	0,285	3,2	insecticide	Carbamate	IRAC-1A
ALFA-CYPERMETHRIN	2025	0,033	100	insecticide	Pyrethroid	IRAC-3
ALLETHRIN	2030	6	287	insecticide	Pyrethroid	IRAC-3
ALLOXYDIM-SODIUM	2960	16	351	herbicide	Cyclohexanedione oxime	HRAC-A
ALUMINIUM PHOSPHIDE	62	34	533	rodenticide		
AMIDOSULFURON	2000	1000	1000	herbicide	Sulfonylurea	HRAC-B
AMITRAZ	788	27	20	insecticide	Amidine	IRAC-19
AMITROLE	2150	100	448	herbicide	Triazole	HRAC-F3
AMMONIUM GLUPHOSINATE	2000	100	200	herbicide	Phosphinic acid	HRAC-H
ANILAZINE	1000	16	1000	fungicide		
ANTHRAQUINONE	2000	34	1000	repellent		
ASULAM	4000	100	873	herbicide	Carbamate	HRAC-I
ATRAZINE	5000	97,1	78	herbicide	1,3,5-Triazine	HRAC-C1
AZACONAZOLE	1250	100	698	fungicide	Triazole	FRAC-3
AZAMETHIPHOS	30,2	0,1	123	insecticide	Organophosphate	IRAC-1B
AZIMSULFURON	2250	25	1000	herbicide	Sulfonylurea	HRAC-B
AZINPHOS-ETHYL	12,5	0,1	123	insecticide	Organophosphate	IRAC-1B
AZINPHOS-METHYL	8,5	0,1	59	insecticide	Organophosphate	IRAC-1B
AZOCYCLOTIN	144	100	806	insecticide	Organotin acaricide	IRAC-12B

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
AZOXYSTROBIN	1000	25	283	fungicide	Methoxyacrylate	FRAC-11
Bacillus thuringiensis	3200	100	282	insecticide		IRAC-11
BENALAXYL	3700	100	180	fungicide	Acylalanine	FRAC-4
BENAZOLIN	3000	480	1000	herbicide	Benzothiadiazole	HRAC-O
BENDIOCARB	3,1	0,1	96	insecticide	Carbamate	IRAC-1A
BENFLURALIN	2000	100	351	herbicide	Dinitroaniline	HRAC-K1
BENFURACARB	92	0,29	96	insecticide	Carbamate	IRAC-1A
BENOMYL	100	50	10,5	fungicide	Benzimidazole	FRAC-1
BENQUINOX	1042	1745	351	fungicide		
BENSULTAP	311	25,9	30	insecticide	Bensultap	IRAC-4C
BENTAZON	1140	200	870	herbicide	Benzothiadiazinone	HRAC-C3
BENZOXIMATE	897	34	533	acaricide		
BENZOYLPROP-ETHYL	1995	175	873	herbicide		
BETA-CYFLUTHRIN	2000	0,05	1000	Insecticide	Pyrethroid	IRAC-3
BIFENOX	1250	100	243,9	herbicide	Diphenyl ether	HRAC-E
BIFENTHRIN	1800	0,015	287	insecticide	Pyrethroid	IRAC-3
BINAPACRYL	2000	100	552	fungicide	Dinitrophenyl crotonates	FRAC-29
BIOALLETHRIN	2030	6	287	insecticide	Pyrethroid	IRAC-3
BIORESMETHRIN	2000	0,002	287	insecticide	Pyrethroid	IRAC-3
BITERTANOL	776	104,4	1000	fungicide	Triazole	FRAC-3
BOSCALID	2000	166	1000	fungicide	Carboxamide	FRAC-7
BRODIFACOUM	62	34	533	rodenticide	Hydroxycoumarin	
BROMACIL	2250	100	351	herbicide	Uracil	HRAC-C1
BROMADIOLONE	138	100	1000	rodenticide	Coumarin anticoagulant	
BROMOCYCLEN	897	34	108	insecticide		
BROMOFENOXIM	2800	10	1300	herbicide	Nitrile	HRAC-C3
BROMOPHOS	1375	1	123	insecticide	Organophosphate	IRAC-1B
BROMOPHOS-ETHYL	200	0,44	123	insecticide	Organophosphate	IRAC-1B
BROMOPROPYLATE	2000	183	282	insecticide	Benzilate	
BROMOXYNIL	217	5	45	herbicide	Hydrobenzoxazole	HRAC-C3
BROMUCONAZOLE	2150	100	1000	fungicide	Triazole	FRAC-3
BUMINAFOS	5000	50	1133	herbicide		
BUPIRIMATE	2747	50	552	fungicide	Pyrimidinol	FRAC-8
BUPROFEZIN	10	100	1000	insecticide	Buprofenzin	IRAC-16

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
BUTRALIN	2250	55	351	herbicide	Dinitroaniline	HRAC-K1
BUTYLATE	4640	100	343	herbicide	Thiocarbamate	HRAC-N
CAPTAFOL	2510	100	351	fungicide	Phtalimide	FRAC-M4
CAPTAN	100	91	237,4	fungicide	Phtalimide	FRAC-M4
CARBARYL	2000	1	106	insecticide	Carbamate	IRAC-1A
CARBENDAZIM	10710,5	50	6	fungicide	Benzimidazole	FRAC-1
CARBETAMIDE	2000	20	600	herbicide	Carbamate	HRAC-K2
CARBOFURAN	2,5	9,7	165	insecticide	Carbamate	IRAC-1A
CARBOSULFAN	8,1	1	96	insecticide	Carbamate	IRAC-1A
CARBOXIN	6094	181	500	fungicide	Carboxamide	FRAC-7
CARFENTRAZONE-ETHYL	2250	200	820	herbicide	Triazolinone	HRAC-E
CHLORBROMURON	2500	16	578	herbicide	Urea	HRAC-C2
CHLORBUFAM	2000	42	343	herbicide	Carbamate	HRAC-K2
CHLORFACINON	100	34	533	rodenticide		
CHLORFENVINPHOS	3	0,55	123	insecticide	Organophosphate	IRAC-1B
CHLORIDAZON	2000	200	1050	herbicide	Pyridazinone	HRAC-C1
CHLORMEQUAT	261	100	320	growth regulator	Quaternary ammonium	
CHLORMEQUAT CHLORIDE	261	100	2111	growth regulator	Quaternary ammonium	
CHLOROPICRINE	43	55	282	insecticide		
CHLOROXURON	2000	16	578	herbicide		HRAC-C2
CHLORPROPHAM	2000	89	343	herbicide	Carbamate	HRAC-K2
CHLORPYRIPHOS	32	0,059	123	insecticide	Organophosphate	IRAC-1B
CHLORPYRIPHOS-METHYL	2500	0,38	123	insecticide	Organophosphate	IRAC-1B
CHLORTHALONIL	4640	63	404	fungicide	Chloronitrile	FRAC-M5
CHLORTHIAMID	500	1,22	351	herbicide	Nitrile	HRAC-L
CHLORTOLURON	2150	20	1000	herbicide	Urea	HRAC-C2
CINIDON-ETHYL	2000	200	1000	herbicide	N-phenylphthalimide	HRAC-E
CLETHODIM	2000	100	454	herbicide	Cyclohexanedione oxime	HRAC-A
CLODINAFOP-PROPARGYL	2000	100	210	herbicide	Aryloxyphenoxypropionate	HRAC-A
CLOFENTEZINE	3000	100	1000	insecticide	Mite growth inhibitor	IRAC-10A
CLOMAZONE	2510	100	156	herbicide	Isoxazolidinone	HRAC-F3
CLOPYRALID	1465	16	100	herbicide	Pyridinecarboxylic acid	HRAC-O
CLOQUINTOCET-MEXYL	2000	100	1000	herbicide		
Coniothyrium minitans	1042	1745	643	fungicide		

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
COPPER(HYDROXIDE)	3400	100	100	fungicide	Inorganic	FRAC-M1
COPPEROXYCHINOLATE	2100	59	100	fungicide	Inorganic	FRAC-M1
COPPEROXYCHLORIDE	3400	34	98,1	fungicide	Inorganic	FRAC-M1
COUMAPHOS	897	34	533	Insecticide	Organophosphate	IRAC-1B
CUMATETRALYL	62	34	533	rodenticide	Coumarin anticoagulant	
CUPRIC SULPHATE	600	1	100	fungicide	Inorganic	FRAC-M1
CYANAMIDE	350	26	100	herbicide		
CYANAZINE	400	100	720	herbicide	1,3,5-Triazine	HRAC-C1
CYAZOFAMIDE	2000	100	1000	fungicide	Cyanoimidazole	FRAC-21
CYCLANILIDE	216	89,5	469	growth regulator		
CYCLOATE	2000	11	343	herbicide	Thiocarbamate	HRAC-N
CYCLOXYDIM	2000	100	1000	herbicide	Cyclohexanedione oxime	HRAC-A
CYCLURON	1615	123	578	herbicide	Urea	HRAC-C2
CYFLUTHRIN	2000	0,001	1000	insecticide	Pyrethroid	IRAC-3
CYHALOFOP-BUTYL	2250	40	1000	herbicide	Aryloxyphenoxypropionate	HRAC-A
CYHALOTHRIN	5000	0,04	1200	insecticide	Pyrethroid	IRAC-3
CYHEXATIN	650	32	32	insecticide	Organotin acaricide	IRAC-12B
CYMIAZOL	897	34	533	insecticide		
CYMOXANIL	2250	25	2208	fungicide	Cyanoacetamide oxime	FRAC-27
CYPERMETHRIN	2000	0,02	506	insecticide	Pyrethroid	IRAC-3
CYPROCONAZOLE	150	0,1	335	fungicide	Triazole	FRAC-3
CYPRODINIL	500	100	192	fungicide	Anilinopyrimidine	FRAC-9
CYROMAZINE	1785	5	1000	insecticide	Cyromazine	IRAC-17
DALAPON	5660	12,7	351	herbicide	Halogenated alkanolic acid	HRAC-N
DAMINOZIDE	1577	20060	10680	growth regulator		
DAZOMET	415	100	1000	insecticide	Other	HRAC-Z
DELTAMETHRIN	2250	0,079	1290	insecticide	Pyrethroid	IRAC-3
DEMETON-S-METHYL	44	1	250	insecticide	Organophosphate	IRAC-1B
DEMETON-S-METHYL SULPHON	44	0,19	250	insecticide	Organophosphate	IRAC-1B
DESMEDIPHAM	2000	50	79	herbicide	Phenyl carbamate	HRAC-C1
DESMETRYN	2500	101	160	herbicide	Triazine	HRAC-C1
DIALATE	3034	48	290	herbicide	Thiocarbamate	HRAC-N
DIAZINON	3,5	0,2	123	insecticide	Organophosphate	IRAC-1B
DICAMBA	2000	100	762	herbicide	Benzoic acid	HRAC-O

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
DICHLOBENIL	683	16	1000	herbicide	Benzonitrile	HRAC-L
DICHLOFENTHION	897	34	533	insecticide		
DICHOFLUANID	5000	100	890	fungicide	Sulfamide	FRAC-M6
DICHLORMID	2000	100	351	herbicide		
DICHLORO-1,3-PROPENE	152	6,6	1000	insecticide		
DICHLOROPHEN	1042	1745	643	fungicide		
DICHLORPROP-P	250	25	994	herbicide	Phenoxyacetic acid	HRAC-O
DICHLORVOS	24	0,29	123	insecticide	Organophosphate	IRAC-1B
DICLOBUTRAZOL	1042	1745	643	fungicide		
DICLORAN	2000	180	239	fungicide	Aromatic hydrocarbon	FRAC-14
DICOFOL	320	50	43	insecticide		IRAC-20
DIENOCHLOR	683	33	500	insecticide		
DIETHATYL-ETHYL	2100	43,5	429	herbicide		
DIETHOFENCARB	2250	20	573,9478982	fungicide	N-phenyl carbamate	FRAC-10
DIETHYL-TOLUAMIDE (DEET)	2000	34	1000	Repellent		
DIFENACOUM	62	34	533	rodenticide	Hydroxycoumarin	
DIFENOCONAZOLE	2000	100	610	fungicide	Triazole	FRAC-3
DIFENOXURON	1995	175	873	herbicide		
DIFENZOQUAT	1250	36	351	herbicide	Sulfate	HRAC-Z
DIFETHIALONE	0,264	34	533	rodenticide	Coumarin anticoagulant	
DIFLUBENZURON	2000	30	367	insecticide	Benzoylurea	IRAC-15
DIFLUFENICAN	2150	100	1023	herbicide	Pyridinecarboxamide	HRAC-F1
DIMEFURON	3350	500	578	herbicide	Urea	HRAC-C2
DIMETHENAMID	1908	1000	459,8	herbicide	Chloroacetamide	HRAC-K3
DIMETHENAMID-P	1068	134	294,4	herbicide	Chloroacetamide	HRAC-K3
DIMETHIPIN	896	100	39,4	herbicide		
DIMETHOATE	10,5	0,12	31	insecticide	Organophosphate	IRAC-1B
DIMETHOMORPH	2000	32,4	1000	fungicide	Cinnamic acid	FRAC-15
DINICONAZOLE	1490	20	698	fungicide	Triazole	FRAC-3
DINOCAP	200	55	282	fungicide	Dinitrophenyl crotonates	FRAC-29
DINOSEB	2000	0,1	351	herbicide	Dinitrophenol	HRAC-M
DINOTERB	2000	0,1	351	herbicide	Dinitrophenol	HRAC-M
DIQUAT	83	13	130	herbicide	Bipyridylum	HRAC-D
DIQUAT DIBROMIDE	83	13	130	herbicide	Bipyridylum	HRAC-D

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
DITHIANON	290	100	578,4	fungicide	Quinone	FRAC-M9
DIURON	1615	100	698	herbicide	Urea	HRAC-C2
DNOC	6	1,79	15	insecticide	Dinitrophenol	HRAC-M
DODEMORPH	2000	100	481	fungicide	Morpholine	FRAC-5
DODINE	788	11	547	fungicide	Guanidine	FRAC-M7
ENDOSULFAN	205	100	533	insecticide	Cyclodiene	IRAC-2A
ENDOTHAL-SODIUM	111	100	351	herbicide		
ENILCONAZOLE	1903	130	707	fungicide	Triazole	FRAC-3
EPOXICONAZOLE	2000	100	1000	fungicide	Triazole	FRAC-3
EPTC	1000	11	343	herbicide	Thiocarbamate	HRAC-N
ESFENVALERATE	1312	0,06	10,6	insecticide	Pyrethroid	IRAC-3
ETHEPHON	1072	100	10680	growth regulator	Ethylene generator	
ETHIOFENCARB	155	6	262	insecticide	Carbamate	IRAC-1A
ETHION	128	1	123	insecticide	Organophosphate	IRAC-1B
ETHIRIMOL	4000	200	552	fungicide	Hydroxy-(2-amino-)pyrimidine	FRAC-8
ETHOFUMESATE	2000	50	134	herbicide	Benzofuran	HRAC-N
ETHOPROPHOS	5,6	100	2824	insecticide	Organophosphate	IRAC-1B
ETHOXSULFURON	2000	200	1000	herbicide	Sulfonylurea	HRAC-B
ETOFENPROX	2000	130	47	insecticide	Non-ester pyrethroid	IRAC-3
ETRIDIAZOLE	560	140	247	fungicide	Aromatic hydrocarbon	FRAC-14
ETRIMFOS	1334	0,1	123	insecticide		
FAMOXADONE	2250	63	470	fungicide	Oxazolidinedione	FRAC-11
FENAMIDONE	2000	74,8	25	fungicide	Imidazolinone	FRAC-11
FENAMINOSULF	13	100	552	fungicide		
FENAMIPHOS	0,7	1,43	409	insecticide	Organophosphate	IRAC-1B
FENARIMOL	2000	100	25	fungicide	Pyrimidine	FRAC-3
FENAZAQUIN	1747	8,18	282	insecticide	METI-acaricide	IRAC-21
FENBUCONAZOLE	2150	290	698	fungicide	Triazole	FRAC-3
FENBUTATIN-OXYDE	397	200000	419	insecticide	Organotin acaricide	IRAC-12B
FENCHLORAZOLE-ETHYL	2400	200	351	herbicide		
FENHEXAMID	2000	102	1000	fungicide	Hydroxylanilide	FRAC-17
FENITROTHION	23,6	0,018	123	insecticide	Organophosphate	IRAC-1B
FENOXAPROP-P-ETHYL	2000	300	1000	herbicide	Aryloxyphenoxypropionate	HRAC-A
FENOXYCARB	7000	100	850	insecticide	Juvenile hormone mimic	IRAC-7B

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
FENPICLONIL	2510	5	67	fungicide	Phenylpyrrole	FRAC-12
FENPROPATHRIN	1089	0,05	287	insecticide	Pyrethroid	IRAC-3
FENPROPIDIN	370	10	1	fungicide	Piperidine	FRAC-5
FENPROPIMORPH	2000	100	1000	fungicide	Morpholine	FRAC-5
FENPYROXIMATE	2000	30	221	insecticide	METI-acaricide	IRAC-21
FENTHION	7,2	0,1	562	insecticide	Organophosphate	IRAC-1B
FENTIN ACETATE	77,4	100	31,9	fungicide	Organotin fungicide	FRAC-30
FENTIN HYDROXIDE	77,4	100	31,9	fungicide	Organotin fungicide	FRAC-30
FENURON	1615	123	698	herbicide	Urea	HRAC-C2
FENVALERATE	1600	0,23	287	insecticide	Pyrethroid	IRAC-3
FERBAM	1000	100	436	fungicide	Dimethyldithiocarbamate	FRAC-M3
FERRIC PHOSPHATE	5000	500	10	Molluscide	Inorganic	
FIPRONIL	11,3	0,01	1000	insecticide	Fiprole	IRAC-2B
FLAZASULFURON	2000	100	15,75	herbicide	Sulfonylurea	HRAC-B
FLOCOUMAFEN	24	34	533	rodenticide	Coumarin anticoagulant	
FLORASULAM	1046	100	1320	herbicide	Triazolopyrimidine	HRAC-B
FLUAZIFOP-P-BUTYL	3500	200	1000	herbicide	Aryloxyphenoxypropionate	HRAC-A
FLUAZINAM	4190	200	1000	fungicide	2,6-Dinitro-anilines	FRAC-29
FLUBENZIMINE	897	34	533	insecticide		
FLUCYCLOXURON	2000	100	1000	insecticide	Benzoylurea	IRAC-15
FLUCYTHRANATE	2510	0,078	287	insecticide	Pyrethroid	IRAC-3
FLUDIOXONIL	2000	329	1000	fungicide	Phenylpyrrole	FRAC-12
FLUFENACET	1608	25	226	herbicide	Oxyacetamide	HRAC-K3
FLUFENOXURON	2000	100	1000	insecticide	Benzoylurea	IRAC-15
FLUMEQUINE	1995	175	873	herbicide		
FLUMIOXAZINE	2250	100	982	herbicide	N-phenylphthalimide	HRAC-E
FLUORODIFEN	1995	175	873	herbicide		
FLUOROGLYCOFEN-ETHYL	3160	100	270	herbicide	Diphenyl ether	HRAC-E
FLUPOXAM	1061	40	484	herbicide	Triazolcarboxamide	HRAC-L
FLUPYRSULFURON-METHYL	2250	25	1000	herbicide	Sulfonylurea	HRAC-B
FLUQUINCONAZOLE	2000	130	1000	fungicide	Triazole	FRAC-3
FLUROCHLORIDONE	2150	100	270	herbicide	Other	HRAC-F1
FLUROXYPYR	2000	100	1000	herbicide	Pyridinecarboxylic acid	HRAC-O
FLUROXYPYR-MEPTYL	2000	113	1000	Herbicide	Pyridinecarboxylic acid	HRAC-O

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
FLURPRIMIDOL	1577	20060	10680	growth regulator	Pyrimidinyl carbinol	
FLURTAMONE	2530	100	1800	herbicide	Other	HRAC-F1
FLUSILAZOLE	1590	150	748	fungicide	Triazole	FRAC-3
FLUTOLANIL	2000	100	1000	fungicide	Carboxamide	FRAC-7
FLUTRIAFOL	5000	5	698	fungicide	Triazole	FRAC-3
FLUVALINATE	2510	6	1000	insecticide	Pyrethroid	IRAC-3
FOLPET	2000	200	1000	fungicide	Phthalimide	FRAC-M4
FONOFOS	128	8,7	218	insecticide		
FORAMSULFURON	2000	226,3	453	herbicide	Sulfonylurea	HRAC-B
FORMETANATE	12	14	1048	insecticide	Carbamate	IRAC-1A
FORMOTHION	630	0,15	158	insecticide		
FOSETYL	8000	461,8	1000	fungicide	Phosphonate	FRAC-33
FOSETYL-ALLUMINIUM	8000	461,8	1000	fungicide	Phosphonate	FRAC-33
FOSTIAZATE	10	0,256	2824	insecticide	Organophosphate	IRAC-1B
FOXIM	40	1	123	insecticide		
FUBERIDAZOLE	750	187,2	1000	fungicide	Benzimidazole	FRAC-1
FURATHIOCARB	25	1	100	insecticide	Carbamate	IRAC-1A
GLUFOSINATE AMMONIUM	2000	100	1000	herbicide	Phosphinic acid	HRAC-H
GLYPHOSATE	2000	100	480	herbicide	Glycine derivate	HRAC-G
GLYPHOSATE-TRIMESIUM	950	400	1000	herbicide	Glycine derivate	HRAC-G
GRANULOSEVIRUS	2000	100	1000	insecticide		
GUAZATINE	82	200	1000	fungicide	Guanidine	FRAC-M7
GUAZATINE TRIACETATE	82	200	1000	fungicide	Guanidine	FRAC-M7
HALFENPROX	1884	100	218	insecticide	Non-ester pyrethroid	IRAC-3
HALOXYFOP-ETOTYL	2150	100	880	herbicide	Aryloxyphenoxypropionate	HRAC-A
HALOXYFOP-R-METHYL	1159	100	261	herbicide	Aryloxyphenoxypropionate	HRAC-A
HEPTENOPHOS	17	1	98	insecticide	Organophosphate	IRAC-1B
HEXACONAZOLE	4000	100	414	fungicide	Triazole	FRAC-3
HEXAZINONE	2258	60	270	herbicide	1,2,4-Triazinone	HRAC-C1
HEXYTHIAZOX	2510	200	1000	insecticide	Mite growth inhibitor	IRAC-10A
HYDROQUINOLINE SULFATE	5000	5000	552	fungicide	Sulfate	
HYMEXAZOL	1000	100	1000	fungicide	Heteroaromatic	FRAC-32
IMAZALIL	510	35,1	541	fungicide	Imidazole	FRAC-3
IMAZAMETHABENZ-METHYL	2150	100	123	herbicide	Imidazolinone	HRAC-B

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
IMAZAMOX	1846	40	901	herbicide	Imidazolinone	HRAC-B
IMAZAPYR	2150	100	132	herbicide	Imidazolinone	HRAC-B
IMAZAQUIN	2150	100	23,5	herbicide	Imidazolinone	HRAC-B
IMAZETHAPYR	2150	100	10000	herbicide	Imidazolinone	HRAC-B
IMIDACLOPRID	31	0,01	10,7	insecticide	Neonicotinoid	IRAC-4A
INDOL-3-YLACETIC ACID	1577	20060	10680	growth regulator	Auxin	
INDOXACARB	897	34	533	Insecticide	Oxadiazine	IRAC-22
IODOFENPHOS	897	34	533	insecticide		
IODOSULPHURON	2000	75	1000	herbicide	Sulfonylurea	HRAC-B
IOXYNIL	62	100	60	herbicide	Hydroxybenzotrile	HRAC-C3
IPRODIONE	2000	25	1000	fungicide	Dicarboximide	FRAC-2
IPROVALICARB	2000	199	1000	fungicide	Amino acid amide carbamate	FRAC-U1
ISOCARBAMID	1995	175	873	herbicide		
ISOFENPHOS	8,7	0,61	404	insecticide	Organophosphate	IRAC-1B
ISOPROTURON	1401	195	1000	herbicide	Urea	HRAC-C2
ISOXABEN	2000	102	100	herbicide	Benzamide	HRAC-L
ISOXAFLUTOLE	2150	100	1000	herbicide	Isoxazole	HRAC-F2
KRESOXIM-METHYL	2150	14	937	fungicide	Oximinoacetate	FRAC-11
LAMBDA-CYHALOTHRIN	3950	0,038	1000	insecticide	Pyrethroid	IRAC-3
LENACIL	5620	16	8400	herbicide	Uracil	HRAC-C1
LINDANE	122	0,2	59	insecticide	Organochlorine	IRAC-2B
LINURON	314	160	1000	herbicide	Urea	HRAC-C2
MAGNESIUM FOSFIDE	2100	59	100	anorganic	Inorganic	
MALATHION	1375	0,7	123	insecticide	Organophosphate	IRAC-1B
MALEIC HYDRAZIDE	4640	100000	1000	growth regulator	Pyridazine	
MANCOZEB	700	193	454,7	fungicide	(Alkylenebis)dithiocarbamate	FRAC-M3
MANEB	1500	100	960	fungicide	(Alkylenebis)dithiocarbamate	FRAC-M3
MCPA	377	100	234	herbicide	Phenoxy-carboxylic acid	HRAC-O
MCPB	282	100	551	herbicide	Phenoxy-carboxylic acid	HRAC-O
MECARBAM	322	6	96	insecticide	Organophosphate	IRAC-1B
MECOPROP	500	60	988	herbicide	Phenoxy-carboxylic acid	HRAC-O
MECOPROP-P	497	60	988	herbicide	Phenoxy-carboxylic acid	HRAC-O
MEFENPYR-DIETHYL	2000	700	1000	herbicide		
MEFLUIDIDE	1577	20060	10680	growth regulator		

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
MEPANIPYRIM	2250	100	500	fungicide	Anilinopyrimidine	FRAC-9
MEPIQUAT CHLORIDE	2000	100	440	growth regulator	Quaternary ammonium	
MEPRONIL	8000	100	552	fungicide	Carboxamide	FRAC-7
MESOSULFURON-METHYL	2000	5,6	1000	herbicide	Sulfonylurea	HRAC-B
MESOTRIONE	2000	11	437,7	herbicide	Triketone	HRAC-F2
METALAXYL	923	200	1000	fungicide	Acylalanine	FRAC-4
METALAXYL-M	981	127	830	fungicide	Acylalanine	FRAC-4
METALDEHYDE	170	100	50000	Molluscide		
METAMITRON	1000	100	1000	herbicide	1,2,4-Triazinone	HRAC-C1
METAM-SODIUM	500	100	676	insecticide		HRAC-Z
METAZACHLOR	2000	100	440	herbicide	Chloroacetamide	HRAC-K3
METCONAZOLE	787	90	1000	fungicide	Triazole	FRAC-3
METHABENZTHIAZURON	2000	100	578	herbicide	Urea	HRAC-C2
METHAMIDOPHOS	25	0,86	73	insecticide	Organophosphate	IRAC-1B
METHIDATHION	23,6	0,13	3,6	insecticide	Organophosphate	IRAC-1B
METHIOCARB	5	100	200	insecticide	Carbamate	IRAC-1A
METHOMYL	15,4	0,08	22	insecticide	Carbamate	IRAC-1A
METHOXYCHLOR	2000	6	108	insecticide		
METHYL BROMIDE	73	100	282	insecticide	Fumigant	IRAC-8A
METHYL ISOTHIOCYANATE	136	100	282	insecticide		
METIRAM	2150	80	1000	fungicide	(Alkylenebis)dithiocarbamate	FRAC-M3
METOBROMURON	565	130	467	herbicide	Urea	HRAC-C2
METOSULAM	2000	50	1000	herbicide	Triazolopyrimidine	HRAC-B
METOXURON	1250	100	1000	herbicide	Urea	HRAC-C2
METRIBUZIN	164	35	331,8	herbicide	1,2,4-Triazinone	HRAC-C1
METSULFURON-METHYL	2510	25	1000	herbicide	Sulfonylurea	HRAC-B
MEVINPHOS	0,75	0,027	123	insecticide	Organophosphate	IRAC-1B
MOLINATE	389	11	289	herbicide	Thiocarbamate	HRAC-N
MONALIDE	1995	175	873	herbicide		
MONOLINURON	500	14	100	herbicide	Urea	HRAC-C2
MONURON	1995	175	873	herbicide		
MYCLOBUTANIL	510	100	250	fungicide	Triazole	FRAC-3
NAPROPAMIDE	5600	121	100	herbicide	Alkanamide	HRAC-K3
NEBURON	1615	123	698	herbicide	Urea	HRAC-C2

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
NICOSULFURON	2250	20	1000	herbicide	Sulfonylurea	HRAC-B
NITROFEN	1995	175	873	herbicide		
NITROTHALE-ISOPROPYL	4200	16	1200	fungicide		
NUARIMOL	200	100	100	fungicide	Pyrimidine	FRAC-3
OFURACE	5000	58	1000	fungicide	Butyrolactone	FRAC-4
OMETHOATE	79,7	0,048	23	insecticide	Organophosphate	IRAC-1B
OXADIARGYL	2000	200	1000	herbicide	Oxadiazole	HRAC-E
OXADIAZON	1000	400	1000	herbicide	Oxadiazole	HRAC-E
OXADIXYL	2510	100	1000	fungicide	Oxazolidinone	FRAC-4
OXAMYL	2,8	0,094	126	insecticide	Carbamate	IRAC-1A
OXASULFURON	2250	100	1000	herbicide	Sulfonylurea	HRAC-B
OXYCARBOXIN	1250	181	481	fungicide	Carboxamide	FRAC-7
OXYDEMETON	34	0,31	115	insecticide	Organophosphate	IRAC-1B
OXYDEMETON-METHYL	34	0,31	115	insecticide	Organophosphate	IRAC-1B
PACLOBUTRAZOL	7900	2	10680	growth regulator	Triazole	
Paecilomyces fumosoroseus var. apopka				preparation		
PARAQUAT	35	9,06	1000	herbicide	Pipyridylum	HRAC-D
PARATHION	2,1	0,04	267	insecticide	Organophosphate	IRAC-1B
PARATHION-METHYL	1044	0,165	40	insecticide	Organophosphate	IRAC-1B
PENCONAZOLE	1590	5	1000	fungicide	Triazole	FRAC-3
PENCYCURON	2000	100	1000	fungicide	Phenylurea	FRAC-20
PENDIMETHALIN	1421	100	1000	herbicide	Dinitroaniline	HRAC-K1
PERMETHRIN	2000	0,029	287	insecticide	Pyrethroid	IRAC-3
PHENMEDIPHAM	2100	50	36	herbicide	Phenyl carbamate	HRAC-C1
PHOSALONE	2150	4,5	123	insecticide	Organophosphate	IRAC-1B
PHOSFAMIDONE	3,6	0,17	123	insecticide	Organophosphate	IRAC-1B
PHOSMET	18	1	123	insecticide	Organophosphate	IRAC-1B
PICLORAM	2000	100	551	herbicide	Pyridinecarboxylic acid	HRAC-O
PICOLINAFEN	2250	200	1000	herbicide	Pyridinecarboxamide	HRAC-F1
PICOXYSTROBIN	2250	200	6,7	fungicide	Methoxyacrylate	FRAC-11
PIPERONYL BUTOXIDE	2250	25	282	insecticide		
PIRIMICARB	20,9	4	60	insecticide	Carbamate	IRAC-1A
PIRIMIPHOS-METHYL	200	0,36	123	insecticide	Organophosphate	IRAC-1B
PROCHLORAZ	662	50	207	fungicide	Imidazole	FRAC-3

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
PROCYMIDONE	2255	100	1000	fungicide	Dicarboximide	FRAC-2
PROHEXADIONE-CALCIUM	2000	100	1000	growth regulator		
PROMETON	500	130	153	herbicide	1,3,5-Triazine	HRAC-C1
PROMETRYN	5000	100	153	herbicide	1,3,5-Triazine	HRAC-C1
PROPACHLOR	91	11,3	75	herbicide	Chloroacetamide	HRAC-K3
PROPAMOCARB HYDROCHLORIDE	1842	84	660	fungicide	Carbamate	FRAC-28
PROPAQUIZAFOP	1820	200	1000	herbicide	Aryloxyphenoxypropionate	HRAC-A
PROPAZINE	2500	100	270	herbicide	1,3,5-Triazine	HRAC-C1
PROPETAMFOS	197	1	123	insecticide	Organophosphate	IRAC-1B
PROPHAM	2000	16	343	herbicide	Carbamate	HRAC-K2
PROPICONAZOLE	2510	100	686	fungicide	Triazole	FRAC-3
PROPINEB	5000	70	700	fungicide	(Alkylenebis)dithiocarbamate	FRAC-M3
PROPOXUR	3,55	0,12	165	insecticide	Carbamate	IRAC-1A
PROPOXYCARBAZONE	2000	200	1000	herbicide	Sulfonylaminocarbonyltriazolinone	HRAC-B
PROPOXYCARBAZONE-SODIUM	2000	200	1000	herbicide	Sulfonylaminocarbonyltriazolinone	HRAC-B
PROPYZAMIDE	10000	136	173	herbicide	Benzamide	HRAC-K1
PROSULFOCARB	2250	79	144	herbicide	Thiocarbamate	HRAC-N
PROSULFURON	1000	100	1000	herbicide	Sulfonylurea	HRAC-B
PYMETROZINE	2000	117	250	Insecticide	Pymetrozine	IRAC-9B
PYRACLOSTROBIN	2000	100	567	fungicide	Methoxycarbamate	FRAC-11
PYRAFLUFEN-ETHYL	2000	73,1	567	herbicide	Phenylpyrazole	HRAC-E
PYRAZOPHOS	118	0,25	1000	fungicide	Phosphorothiolate	FRAC-6
PYRETHRINS	500	0,13	287	insecticide	Pyrethrin	IRAC-3
PYRIDABEN	2250	0,55	38	insecticide	METI	IRAC-21
PYRIDATE	1269	100	799	herbicide	Phenylpyridazine	HRAC-C3
PYRIFENOX	2000	59	733	fungicide	Pyridine	FRAC-3
PYRIMETHANIL	2000	100	625	fungicide	Anilinopyrimidine	FRAC-9
PYRIPROXYFEN	2000	100	850	insecticide	Juvenile hormone mimic	IRAC-7C
QUINMERAC	2000	200	2000	herbicide	Quinolinecarboxylic acid	HRAC-O
QUINOXYFEN	2250	1714	923	fungicide	Quinoline	FRAC-13
QUIZALOFOP-P-ETHYL	2000	100	1000	herbicide	Aryloxyphenoxypropionate	HRAC-A
RIMSULFURON	2000	100	1000	herbicide	Sulfonylurea	HRAC-B
ROTENONE	1375	55	282	insecticide	Rotenone	IRAC-21
SCILLIRIDOSE	62	34	533	rodenticide		

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
SETHOXYDIM	5000	10	351	herbicide	Cyclohexanedione oxime	HRAC-A
SILTHIOPHAM	2250	100	133	fungicide	Thiophenecarboximide	FRAC-U2
SILVERTHIOSULPHATE	1577	20060	10680	growth regulator		
SIMAZINE	2000	98,94	1000	herbicide	1,3,5-Triazine	HRAC-C1
S-METOLACHLOR	2510	0,085	570	herbicide	Chloroacetamide	HRAC-K3
SODIUM CHLORATE	1000	10000	100	herbicide		
SODIUMDIKEGULAC	1577	20060	10680	growth regulator		
SPINOSAD	2000	0,0029	1000	Insecticide	Spinosyn	IRAC-5
SPIROXAMINE	565	4,2	1000	fungicide	Spiroketalamine	FRAC-5
STREPTOMYCIN	1042	1745	552	fungicide	Glucopyranosyl antibiotic	FRAC-25
STRYCHINE SULPHATE	62	34	533	rodenticide		
SULCOTRIONE	5620	200	1000	herbicide	Triketone	HRAC-F2
SULFOTEP	2000	100	123	insecticide	Organophosphate	IRAC-1B
SULPHOSULPHURON	2250	25	848	herbicide	Inorganic	HRAC-B
SULPHUR	1000	100	100	fungicide	Inorganic	FRAC-M2
TCA	4280	100	351	herbicide	Halogenated alkanolic acid	HRAC-N
TCMTB	1903	130	707	fungicide	Triazole	FRAC-3
TEBUCONAZOLE	2000	0,6	1381	fungicide	Triazole	FRAC-3
TEBUFENOZIDE	2150	234	1000	insecticide	Diacylhydrazine	IRAC-18
TEBUFENPYRAD	2000	100	221	insecticide	METI	IRAC-21
TECNAZENE	2000	100	552	fungicide	Aromatic hydrocarbon	FRAC-14
TEFLUBENZURON	2250	1000	789	insecticide	Benzoylurea	IRAC-15
TEFLUTHRIN	730	180000	0,32	insecticide	Pyrethroid	IRAC-3
TEMEPHOS	18,9	1,55	123	insecticide	Organophosphate	IRAC-1B
TEPRALOXYDIM	2000	200	1000	herbicide	Cyclohexanedione oxime	HRAC-A
TERBUFOS	145	4,1	2824	insecticide	Organophosphate	IRAC-1B
TERBUTHYLAZINE	1000	100	200	herbicide	1,3,5-Triazine	HRAC-C1
TERBUTRYN	1250	101	170	herbicide	1,3,5-Triazine	HRAC-C1
TETRACHLORVINPHOS	1500	1	123	insecticide	Organophosphate	IRAC-1B
TETRACONAZOLE	422	100	481	fungicide	Triazole	FRAC-3
TETRADIFON	1250	1,01	5000	insecticide		IRAC-1B
THALLIUMSULPHATE	62	34	533	rodenticide		
THIABENDAZOLE	2250	1000	1000	fungicide	Benzimidazole	FRAC-1
THIACLOPRID	49	17,32	105	insecticide	Neonicotinoid	IRAC-4A

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
THIAMETHOXAM	576	0,024	1000	insecticide	Neonicotinoid	IRAC-4A
THIAMETURON-METHYL	1995	175	873	herbicide		
THIOCYCLAM HYDROGEN OXALATE	3,45	8	282	insecticide	2-Dimethylaminopropane-1,3-dithiol analogue	IRAC-4C
THIODICARB	2023	10	38	insecticide	Oxime carbamate	IRAC-1A
THIOFANOX	43	100	96	insecticide	Oxime carbamate	IRAC-1A
THIOFENSULFURON-METHYL	2510	7,1	2000	herbicide	Sulfonylurea	HRAC-B
THIOMETON	46	0,55	44	insecticide	Organophosphate	IRAC-1B
THIOPHANATE-METHYL	5000	100	504,125	fungicide	Benzimidazole	FRAC-1
THIRAM	100	2000	540	fungicide	Dimethyldithiocarbamate	FRAC-M3
TOLCLOFOS-METHYL	5000	140	346	fungicide	Aromatic hydrocarbon	FRAC-14
TOLYLFLUANIDE	5000	100	1000	fungicide	Sulfamide	FRAC-M6
TRIADIMEFON	4000	100	250	fungicide	Triazole	FRAC-3
TRIADIMENOL	2000	100	772	fungicide	Triazole	FRAC-3
TRI-ALLATE	2251	16	343	herbicide	Thiocarbamate	HRAC-N
TRIAPENTHENOL	1000	100	370	growth regulator		
TRIASULFURON	2150	100	1000	herbicide	Sulfonylurea	HRAC-B
TRIAZAMATE	8	27	340	Insecticide	Carbamoyltriazole	IRAC-1A
TRIAZOPHOS	4,2	0,055	187	insecticide	Organophosphate	IRAC-1B
TRIAZOXIDE	106	1745	1000	fungicide	Benzotriazine	FRAC-35
TRIBENURON-METHYL	2250	100	2000	herbicide	Sulfonylurea	HRAC-B
TRICHLORFON	110	10	123	insecticide	Organophosphate	IRAC-1B
TRICHLORONAT	322	6	123	insecticide	Organophosphate	IRAC-1B
TRICLOPYR	1698	100	551	herbicide	Pyridinecarboxylic acid	HRAC-O
TRICOSENE	897	34	533	insecticide		
TRIDEMORPH	1388	200	880	fungicide	Morpholine	FRAC-5
TRIFLOXYSTROBIN	2000	200	1000	fungicide	Oximinoacetate	FRAC-11
TRIFLUMIZOLE	2467	20	125	fungicide	Imidazole	FRAC-3
TRIFLURALIN	2000	100	351	herbicide	Dinitroaniline	HRAC-K1
TRIFLUSULFURON-METHYL	2250	800	1000	herbicide	Sulfonylurea	HRAC-B
TRIFORINE	5000	10	1000	fungicide	Piperazine	FRAC-3
TRINEXAPAC-ETHYL	2000	115	93	growth regulator		
TRITICONAZOLE	2000	130	1000	fungicide	Triazole	FRAC-3
VAMIDOTHION	35	0,01	2824	insecticide	Organophosphate	IRAC-1B
VINCLOZOLIN	2510	2000	1000	fungicide	Dicarboximide	FRAC-2

active substance	LD50bird(mg/kgbw)	LD50bee(µg/bee)	LC50earthworm(mg/kg)	nature	group	resistance code
WARFARIN	62	34	533	rodenticide	Coumarin anticoagulant	
ZETA-CYPERMETHRIN	2000	1	287	insecticide	Pyrethroid	IRAC-3
ZINEB	2000	13,1	436	fungicide	(Alkylenebis)dithiocarbamate	FRAC-M3
ZIRAM	97	100	190	fungicide	Dimethyldithiocarbamate	FRAC-M3
ZOXAMIDE	2000	100	535	fungicide	Benzamide	FRAC-22