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Preface

In the near future harmonised approaches to the zonal evaluation and authorisation of Plant Protection Products will be implemented in the EU. Currently, in the Netherlands and in other countries, national specific spray drift deposition data of plant protection products are used for the authorisation of PPP. At the workshop 'Harmonisation of drift' (Wageningen, December 2010) it was concluded that the Netherlands and Germany would take the lead to further analyse and develop a harmonized spray drift curve for boom sprayers (to investigate possible options that may be expanded to account for other available datasets). In these two countries a large number of spray drift experiments have been carried out and they have many field conditions in common.
However, these two data sets cover different crops and conditions, wind speeds, and vary in details of the trial protocols. Combining these data to cover more conditions and crops than are individually covered requires an analysis of their similarities and differences. The analysis is reported here and forms the basis of a possible methodology for combining other spray drift data sets (*e.g.,* from Belgium, France, Italy, UK) in a coherent and reproducible manner. The analysis gives insights into the research work required in order to attempt large-scale combinations of spray drift data sets.

It should be noted that this analysis is only a first, but important, step towards the possible combining of drift data to create EU harmonized spray drift curves that cover crops as well as bare ground. This report clearly highlights deficiencies in our understanding of spray drift, and on the basis of those insights, recommends further work that could lead to development of pan-European spray drift curves derived from existing deposition drift data sets, supplemented by new data where needed in order to cover wide ranges of crops and application conditions. It is recommended that further data analysis is done using powerful statistical techniques such as quantile regression analysis to such data.

This report gives a summary of the outcome of the analyses of the spray drift data for boom sprayers from Germany and The Netherlands.

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Wageningen - The Netherlands/ Braunschweig - Germany, March 2015

Abstract

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Spray drift data from Germany and The Netherlands were used to generate spray drift deposition curves for a reference situation spraying a bare soil surface or short crop situation (crop height lower than 20 cm) and a cropped situation (crop height higher than 20 cm). Following ISO22866 (2005) and ISO22369-2 (2006) a reference spray application was defined as a boom spray application with a boom height of 0.50 m above bare soil or crop canopy, a nozzle type close to the BCPC Fine/Medium threshold nozzle, and a driving speed of 6-8 km/h. Spray drift data from a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) and a spray boom height of 0.50 m above soil surface or crop canopy were analysed. The analysis of the joined spray drift data results in separate spray drift curves for the bare soil surface or short crop situation and the cropped situation. In contrast to the presently used spray drift curves in the EU authorisation process which are solely based on German data sets, the generated joined spray drift curves give higher spray drift deposition values in general. The reasons for these results are assumed to be due to slightly methodological differences concerning drift measurements in both countries which seem to have high impacts on the achieved results. Especially because spray drift values are evaluated as 90th percentiles the higher Dutch drift results dominate the joined spray drift curves. Against the background of including even more spray drift data sets in order to develop pan-European spray drift curves a further analysis of the presented datasets and additional drift measurements are necessary to explicitly clarify the reasons for the differences in the German and Dutch datasets.

Keywords: spray drift, ISO22866, boom sprayer, spray nozzle, reference situation, bare soil, crop situation

1. Introduction

In the near future the zonal evaluation and authorisation of Plant Protection Products (PPP) will be implemented. This means that the risk assessment methodologies need to be further harmonised and that Member States (MS) will be more restricted in their actions to deviate in their methodology of authorisation. However specific national risk reducing measures may still be in place. Thus, evaluation and authorisation methodologies need to be harmonised as far as possible to prevent work duplicated between Member States.

Currently, in the Netherlands and in other countries, national specific drift deposition data of plant protection products are used for the authorisation of PPP. At the EU workshop 'Harmonisation of Drift' (Huijsmans and Van de Zande, 2011) the background of differences in drift deposition were discussed to achieve further harmonisation. At this workshop the scientific information on the drift issues and the evaluation/ authorisation procedures was addressed with participating representatives from research and assessment agencies of invited Member States, presenting their scientific information and national approach.

Spray drift is in general defined as that part of the applied product that leaves the treated field through the air because of air currents during the application of plant protection products. In the Dutch assessment procedure different spray drift curves are used for arable crops (boom sprayers), fruit crops and nursery trees, all originating from field measurements done in the Netherlands. In the German assessment procedure the Basic Drift Values (Ganzelmeier *et al.*, 1995; Ganzelmeier & Rautmann, 2000; Rautmann *et al.*, 2001) are used differentiated for arable crops, fruit crops, vineyards and hops. The UK, France, Belgium, Poland and Sweden nowadays follow the German drift curves in their assessment procedure for surface water. In the UK these curves are also used for the evaluation of bystander and resident risk for PPP, but soon UK data will be available. Sweden uses Swedish measurement data for boom sprayer evaluation. For orchard crops the German drift curves are used.

An important outcome of the 'Harmonisation of Drift' workshop was that spray drift data originating from recent research in the different Member States may differ considerably from the Basic Drift Values. Most of the countries (NL, DE, UK, PL, BE, SE) use a flat fan (FF) nozzle of size 03/04 as a reference nozzle operated at 3.0 bar spray pressure (Table 1). France uses finer spray quality nozzles as a reference. In the German data also coarser nozzle types (drift reducing) are included, however with no influence on the basic drift values in Germany (being 90-percentile data). Sprayer boom height is in general 0.50 m above crop canopy, except for France where boom height is 0.70 m for the reference spray application. Therefore spray drift potential is highest for the French reference. Spray drift measurements are done mostly on short cut grass or bare soil surface except for the Netherlands where the standard reference is represented by spraying a potato crop. Therefore drift potential for the Netherlands is higher than in other countries. In the Netherlands a separate spray drift curve for bare soil or small crops (i.e. grass) is suggested besides the curve for a developed (arable) crop situation (Zande *et al.*, 2012; Groot *et al.*, 2012) based on crop height (20 cm).

Table 1. Summary table reference boom sprayer.

Item/country	NL	DE	UK	FR	PL	BE	SE
Nozzle	XR11004	FF 03, 04*)	FF110/1.2/3.0	FF11002	FF03	FF03	F, M. C
Spray pressure (bar)	3	2.0 – 5.0	3	2.5	-	3	-
Spray volume (l/ha)	300	150 - 300	Speed dependent	-	-	-	-
Sprayer speed (km/h)	6.5	6-8	6-12 [12,16]†	8	-	-	7.2
Boom height (m)	0.50	0.50	0.5 [0.7, 1.0] †	0.70	0.50	0.50	0.25, 0.40, 0.60
Sprayed surface	Potato, bare soil	Bare soil, Short grass	Short grass – crop	-	-	-	Short grass
Crop height (m)	0.50 / 0.10	0.10	0.05-2.0	-	-	-	-
Sprayed width (m)	24	20	48	-	-	-	96
Temperature range (°C)	5-25	10-25	-	-	-	-	10, 15, 20
Wind speed range (m/s)	1.5-5.0	1-5	2.5 [2.5, 3.5] †	-	-	-	3.0, 4.5
Wind speed height (m)	2.0	2.0	3	-	-	-	2.0

**) Basic drift curve contains data from measurements with other flat fan (FF) nozzle types and sizes (coarser sprays – lower drift).*

† Values in square brackets are recently proposed (not yet adopted) for bystander/resident assessments.

For boom sprayers, only the Netherlands specify the position of the last nozzle relative to the last crop row. This originates from the experience in measuring spray drift in a crop situation where the nozzle position above the last crop row is fixed while the location of the edge of field varies. Other countries measure spray drift in short cereals, on cut grass or bare soil surface, where the edge of field is defined as half a nozzle spacing distance from the last nozzle (following ISO22866, 2005). This corresponds with the working width of the boom to allow neatly joining swaths.

For the MS drift reduction measures follow similar procedures. 50%, 75%, 90% drift reduction classes are generally accepted, a 95% class seems acceptable and it is questioned whether a 99% class still makes sense (following ISO22369-1, 2006). This, of course, depends very much on which reference is chosen for the comparison.

At the 'Harmonisation of Drift' workshop there was a common agreement that general standardised European reference curves should become available. Therefore, all drift data should be analysed and the main affecting influences on the spray drift should be highlighted. Thus, the effect of spray drift mitigation measures (sometimes country specific) could be presented relatively to this reference curve. It was decided that the analysis of the EU drift data would firstly focus at the reference curves for field crops (boom sprayers), based on the spray drift data from Netherlands and Germany, as from these countries most data are available. This report shows the outcome of the analysis, including a statistical investigation of the combined data sets, and includes observations on the work required in order to not only reliably combine these two data sets, but also to enable inclusion of other data from other EU countries.

2. Materials and methods

Spray drift data

In order to come to a harmonised spray drift curve as a first step spray drift data from Germany and The Netherlands were put together and analysed based on earlier published data (Ganzelmeier *et al.* 1995; Ganzelmeier & Rautmann, 2000; BBA, 2000; Huijsmans *et al.*, 1997; Rautmann *et al.*, 2001; Zande *et al.*, 2000; Zande *et al.*, 2012). From the available spray drift datasets a selection was made (subset) for only those trials with boom sprayers specifying a reference spray application. Following ISO22866 (2005) and ISO22369-2 (2006) a reference spray application was defined as a boom spray application with a boom height of 0.50 m above bare soil or crop canopy, a nozzle type close to the BCPC Fine/Medium threshold nozzle (Southcombe *et al.*, 1997), and a driving speed of 6-8 km/h. The nozzle type was further specified. In the joint German and Dutch database the spray drift measurements were done using either an XR11003 or an XR11004 flat fan nozzle. Liquid pressure used was predominantly between 2.5 and 3.5 bar. A distinction was made in spray drift from spraying a bare soil surface or a short crop (max 20 cm crop height) and a developed crop situation (following Zande *et al.*, 2012 and Groot *et al.*, 2012). Furthermore only those data were selected where wind speed during the spray drift measurements was lower than 5 m/s (measured at 2 m height) and the wind direction was between plus and minus 30^o from perpendicular to the driving direction of the sprayer.

From the German spray drift database a selection following these criteria for the reference sprayer resulted in 20 experiments with 200 measurements for the bare soil or short crop situation and 3 experiments with 18 measurements for the crop situation. In this case a 'measurement' corresponds with a single series of downwind deposition samples (see below). The selection of the reference situation for the Dutch database of spray drift measurements resulted in 24 experiments with 48 measurements for the bare soil and short crop situation and 125 experiments with 250 measurements for the crop situation, respectively. Consequently, the joint analysis was done on 248 spray drift measurements in the bare soil surface and short crop situation and on 268 measurements in the crop situation.

Spray drift measurements

Spray drift measurements were performed using standardised spray drift measuring protocols. In a spray drift measurement the amount of applied spray volume blown away downwind of a treated area and deposited on soil surface next to the field is collected on collectors. Generally, a fluorescent tracer (Brilliant Sulpho Flavine) is used to quantify the amount of spray deposition. In order to mimic a spray solution of a plant protection product (PPP) a non-ionic surfactant is added in the Netherlands. Small differences do occur between the spray drift measuring protocols, especially the placement of the collectors and the presentation of the spray drift deposition data. In the Netherlands spray drift is measured using two arrays of collectors (synthetic filter material; Camfil CM-380, Technofil TF290 of 0.5 m x 0.1 m or 1.0 m x 0.1 m size) placed on soil surface next to a sprayed field relative to the position of the last nozzle on the spray boom (Huijsmans *et al.*, 1997; CIW, 2003). The German spray drift is measured using ten filter paper strips (0.03 m x 1.0 m; Macherey-Nagel MN615) at different distances and presented as relative to the edge of the field or crop (BBA, 1992), which is defined as 0.50 m from the position of the last nozzle on the spray boom. Examples of the field setup and the collector lay-out are given in Figure 2 and Figure 3 for the Dutch and German field measurements of spray drift, respectively.

Following ISO22866 (2005) the spray drift deposition data in this study are presented as spray drift deposition at a distance relative to the edge of the treated zone which is defined as half a nozzle spacing distance (0.25 m) from the last nozzle. The German and the Dutch spray drift deposition data are adapted accordingly to the distances defined in ISO22866 (2005) and ISO22369-2 (2006). The 0-points of the drift curves relative to the last nozzle position and the collector positions are for the spray drift measurements in the Netherlands and in Germany and the ISO22866 standard schematically presented in Figure 1.

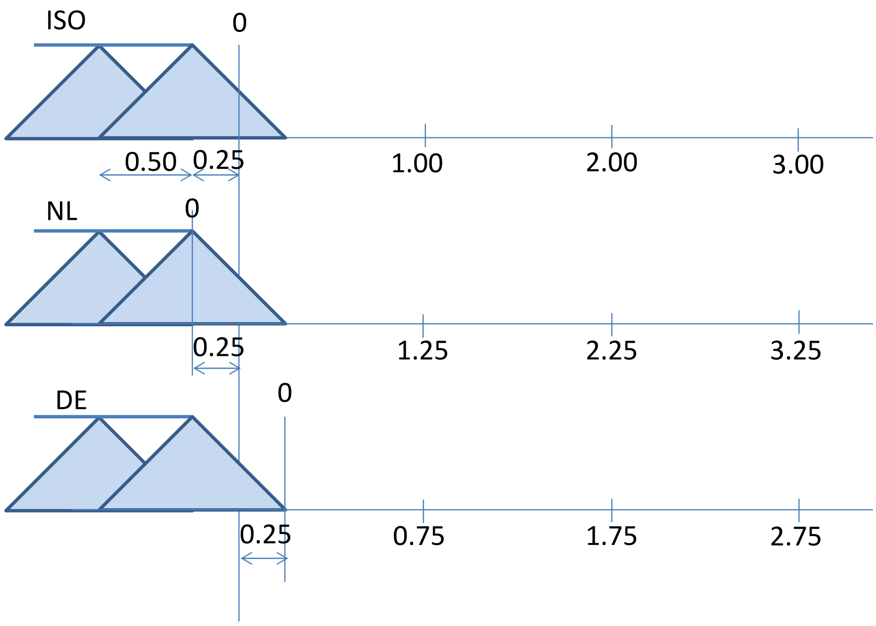

Figure 1. *Schematic presentation of the last nozzle position and defined 0-points of the spray drift curve for the ISO22866 standard and the spray drift measurements in the Netherlands and Germany.*

Spray drift measurements in Germany were performed with boom sprayers having a working width of 10 m spraying the 20 m downwind edge of the field in two swaths. Average weather conditions during spraying the two swaths are used in this study. In the Netherlands a single swath spraying was done with boom sprayers having a working width of 21 m, 24 m and 27 m. The bare soil surface spray drift measurements were in Germany done on cereal stubble, mowed short grassland and bare soil (200 measurements). In the Netherlands the bare soil surface measurements (48 measurements) were done on bare soil surface, and less than 20 cm high crops sugar beet, maize, and wheat. For the cropped situation spray drift data originate from measurements with cereals in Germany (18 measurements) and with the crops potato, wheat, sugar beet, lilies, and mustard (as green manure crop) in the Netherlands (250 measurements).

Weather conditions during spray drift measurements

The weather conditions during the spray drift measurements in the bare soil surface and short crop situation (max. crop height 20 cm) are summarised in Table 2. Wind speed is comparable for the German and Dutch data: 3.1 m/s and 2.9 m/s, respectively. Relative humidity is similar as well: 74% and 78% for Germany and the Netherlands, respectively. Average temperature during spray drift measurements was 18 °C in the Netherlands and 14°C in Germany. Average wind direction during spray drift measurements in the bare soil situation was almost perpendicular to the driving direction: 8° in the Netherlands and 16° in Germany.

Table 2. *Weather conditions during spray drift measurements in the bare soil surface and short crop situation in Germany and The Netherlands.*

	Germany				Netherlands			
	Temp.	RH	Wind-	Wind	Temp.	RH	Wind-	Wind
	°C	%	Direction	Speed [m/s]	°C	%	Direction	Speed [m/s]
Avg	17.7	74	16	3.1	14.0	78	8	2.9
Std	5.3	16	8	0.8	4.4	11	17	0.9
Median	19.6	71	15	2.9	14.2	76	11	3.0
Min	9.1	52	4	1.1	7.5	57	-30	0.9
Max	24.5	98	29	4.3	21.7	97	28	4.9

In the developed crop situation (crop height higher than 20 cm) wind speed during spray drift measurements (Table 3) was higher in the Netherlands (3.3 m/s) than in the German measurements (1.7 m/s). In both countries, wind direction again was almost perpendicular to the driving direction. Average temperature during the spray drift measurements was in the Netherlands higher (19 °C) than in the German measurements (14 °C).

Table 3. *Weather conditions during spray drift measurements in the developed crop situation in Germany and The Netherlands.*

	German				Netherlands			
	Temp.	RH	Wind-	Wind	Temp.	RH	Wind-	Wind
	°C	%	Direction	Speed [m/s]	°C	%	Direction	Speed [m/s]
Avg	14.0	69	12	1.7	18.8	65	3	3.3
Std	3.0	10.6	7.2	0.4	3.3	15.6	18.3	0.9
Median	15.0	67.0	10.0	1.7	19.0	66.0	5.1	3.3
Min	10.0	57.0	4.0	1.2	10.4	0.0	-30.3	0.8
Max	17.0	82.0	21.0	2.1	25.8	96.0	31.0	5.2

Data analysis

Due to the different trial designs – 6 to 10 filter paper strips per distance in the DE data, 2 lines of filter strips in the NL data – the individual subsets of the data are perhaps correlated with the individual drift trials from which they are drawn. However, there is substantial variability in downwind spray drift deposition within a single trial (e.g., Schad and Gao, 2011 in Schad, 2013; Zande *et al.*, 2006; Groot *et al.*, 2014) such that there is a good argument against averaging data from each individual trial. For the purposes of maximising the power of the data set at this early, exploratory level, the individual data points have been considered as independent of each other. Data are analysed and curve fitting is done using a double exponential curve function (Zande *et al.*, 2012; Groot *et al.*, 2012) and a power-law function (Rautmann *et al.*, 2001).

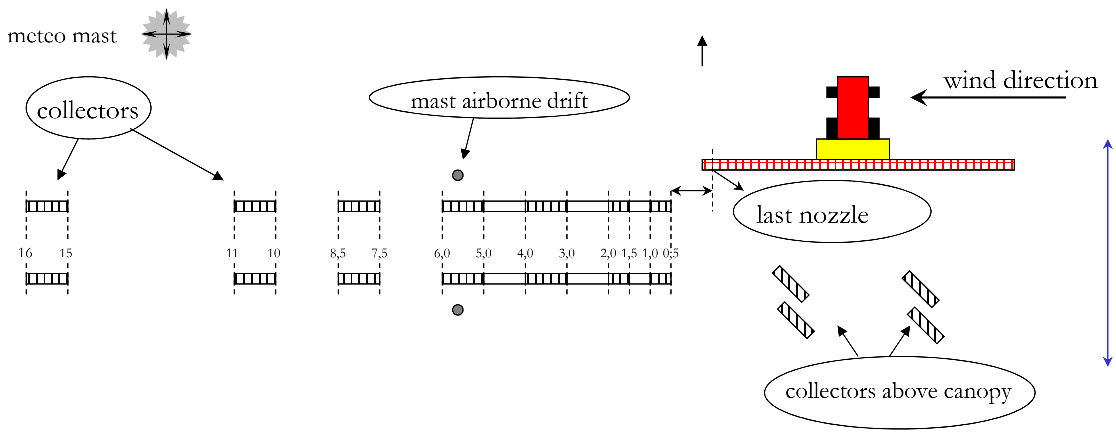

Figure 2. *Collector lay-out for spray drift experiments in the Netherlands. Starting point of distance measurements (0-point) is last nozzle on the spray boom of the sprayer.*

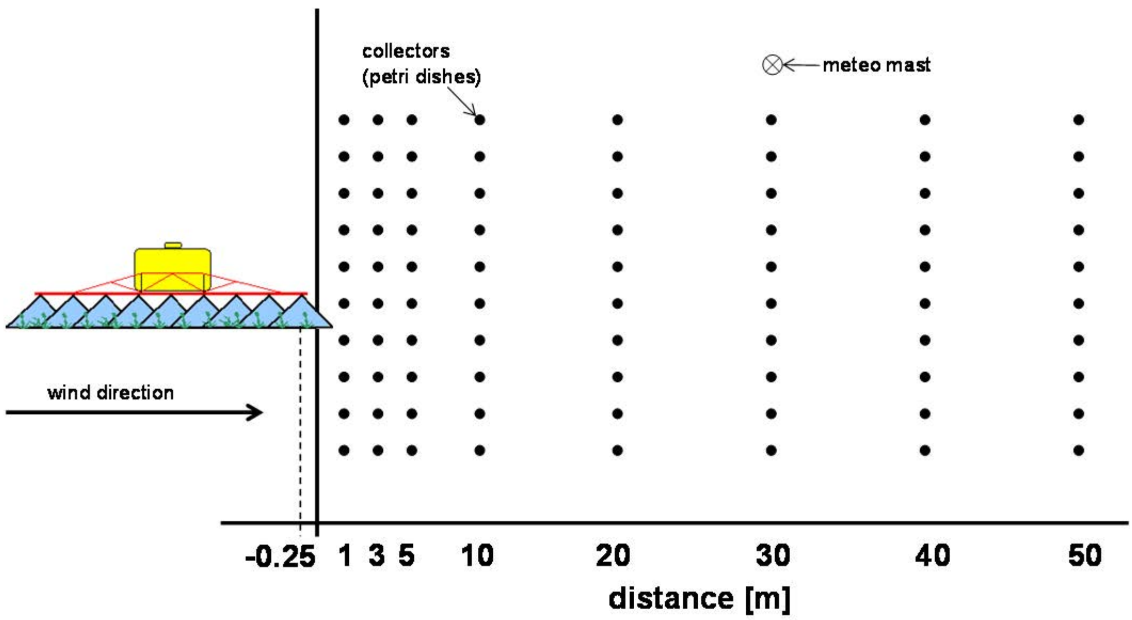

Figure 3. *Collector lay-out for spray drift experiments in Germany. Starting point of distance measurements (0-point) was 0.50 m from the last nozzle on the spray boom of the sprayer (nowadays 0.25 m from last nozzle).*

3. Results

The spray drift database is split up in a part dealing with spray drift measurements done on bare soil surface and low crops (maximum crop height 20 cm) (Section 3.1) and a fully developed crop (Section 3.2). The original data are listed in the Appendices A and B.

3.1 Spray drift spraying a bare soil surface and low crop

3.1.1 Spray drift data from Germany and The Netherlands

Spray drift data from Germany

The German spray drift measurements for the boom sprayer equipped with standard flat fan nozzles XR11003 and XR11004 are presented in Figure 4 and Table 4. Measurements were done down to a distance of 100 m from the field edge.

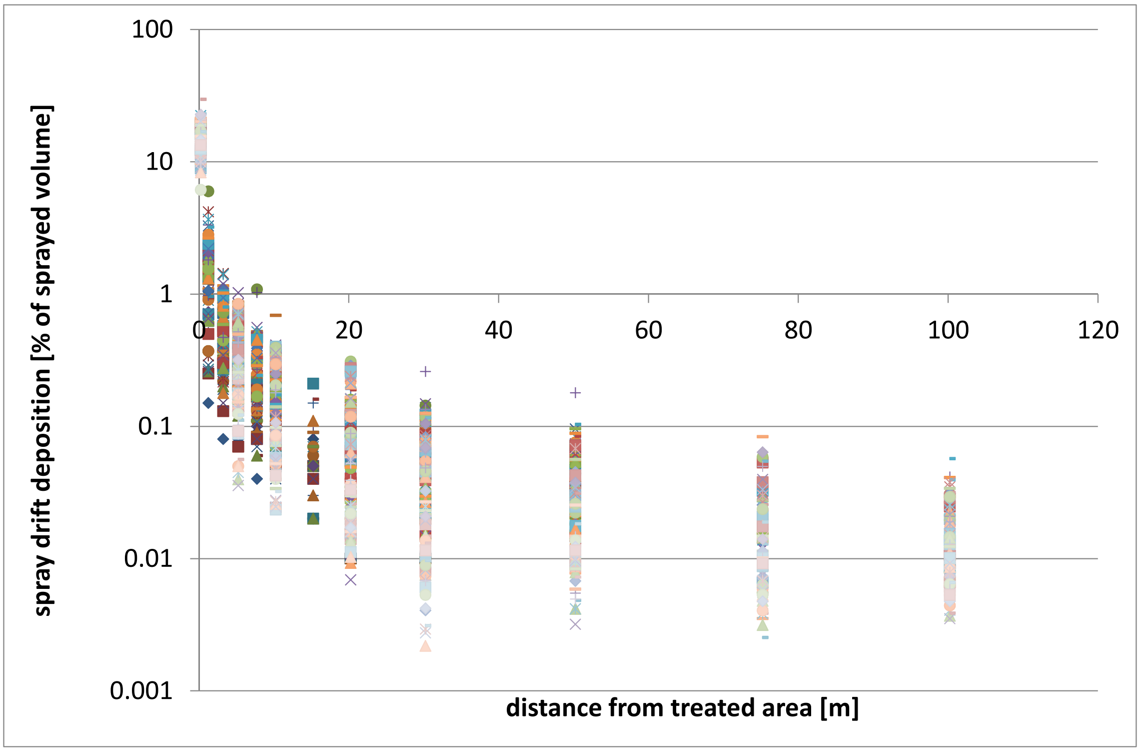

Figure 4. Spray drift deposition (% of sprayed volume) at downwind distances from the treated zone of a sprayed field, German data for a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) (200 measurements).

Based on the German data for bare soil surface spraying spray drift deposition at 1 m distance from the edge of the short crop or the field (Table 4) is on average 1.5% ranging from 0.15% to 6.0%, at 5 m distance spray drift deposition is reduced to 0.35% (0.04%-1.0%) and at 10 m and 20 m distance to respectively 0.17% (0.02%-0.7%) and 0.08% (0.0%-0.3%).

Spray drift data from The Netherlands
The Dutch spray drift measurements for the boom sprayer equipped with standard flat fan nozzles XR11004 are presented in Figure 5 and Table 5. Measurements were done down to a distance of 25 m from the field edge.

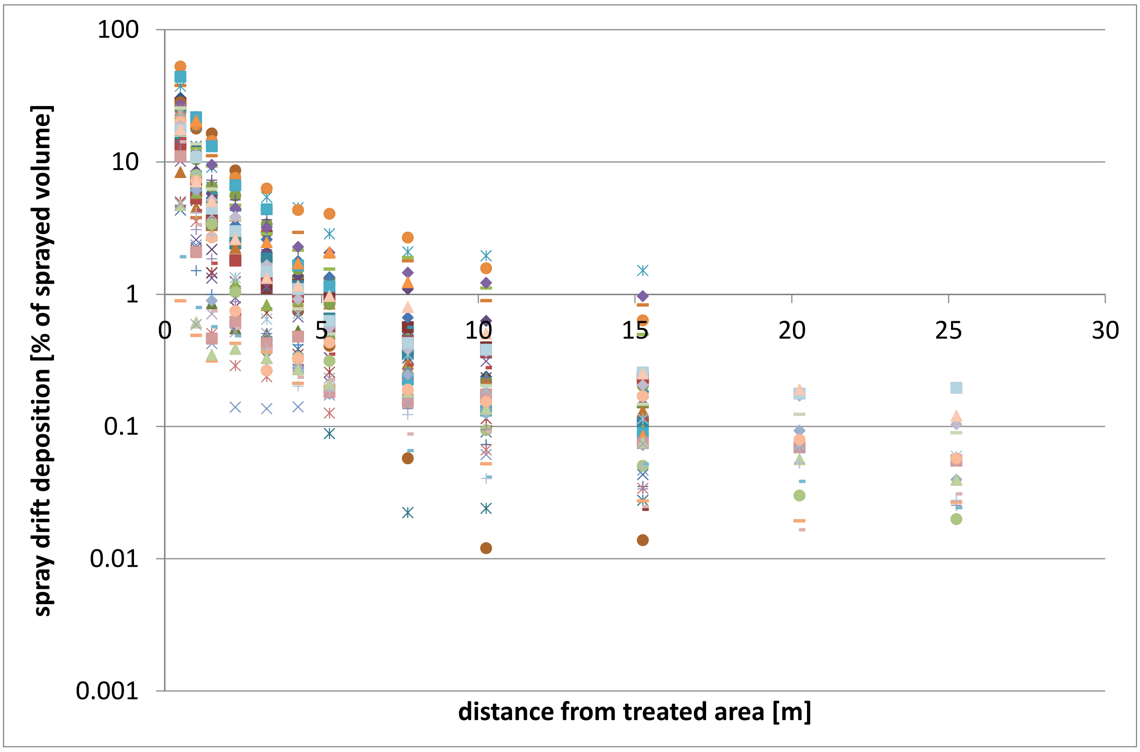

Figure 5. Spray drift deposition (% of sprayed volume) at downwind distances from the crop edge of a sprayed field, Dutch data for a boom sprayer equipped with standard flat fan nozzles (XR11004) (48 measurements).

Based on the Dutch data for bare soil surface spraying spray drift deposition at 1.0 m distance from the edge of the short crop or the field (Table 5) is on average 7.7% ranging from 0.49% to 21.9%, at 5 m distance spray drift deposition is reduced to 0.8% (0.09%-4.0%) and at 10 m and 15 m distance to respectively 0.3% (0.01%-1.9%) and 0.08% (0.01%-1.5%).

Clearly, close to the treated area the spray drift depositions from the Dutch dataset are higher than those of the German dataset. Whereas the weather conditions during the spray drift measurements in the bare soil surface and short crop situation were comparable for the German and Dutch data. In general the Dutch data are in a similar range as the German data although average spray drift deposition is at the 1 m distance 5 times higher than the German. For the distances 5 m to 15 m Dutch spray drift deposition is two to three times higher than the German spray drift deposition at those distances from the field edge. From 20 m onwards Dutch spray drift data are equal or lower than the German data.

Table 4. Spray drift deposition (% of sprayed volume) at downwind distances from the treated zone of a sprayed field, German data for a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004), and its standard deviation, median, minimum and maximum values.

	0.25 m	1.25 m	3.25 m	5.25 m	7,75 m	10.25 m	15.25 m	20.25 m	30.25 m	50.25m	75.25m	100.25m
Nr meas.	110	90	90	200	90	200	30	200	200	170	110	110
Avg	15.6	1.5	0.58	0.35	0.27	0.17	0.063	0.081	0.045	0.033	0.017	0.015
Std	4.1	0.98	0.32	0.21	0.18	0.12	0.046	0.074	0.037	0.025	0.014	0.010
Median	15.6	1.5	0.50	0.30	0.24	0.13	0.050	0.053	0.038	0.028	0.012	0.011
Min	6.1	0.150	0.080	0.036	0.040	0.024	0.020	0.000	0.000	0.003	0.001	0.004
Max	29.7	6.0	1.4	1.0	1.1	0.69	0.21	0.31	0.26	0.18	0.083	0.057

Table 5. Spray drift deposition (% of sprayed volume) at downwind distances from the treated zone of a sprayed field, Dutch data for a boom sprayer equipped with standard flat fan nozzles (XR11004), and its standard deviation, median, minimum and maximum values.

	0.5	1.0	1.5	2.25	3.25	4.25	5.25	7.75	10.25	15.25	20.25	25.25
Nr. Meas	48	48	48	48	48	48	48	48	48	48	16	16
Avg	19.4	7.7	4.5	2.5	1.6	1.0	0.77	0.50	0.31	0.19	0.082	0.061
Std	10.5	5.8	3.8	2.1	1.5	0.97	0.77	0.58	0.40	0.27	0.055	0.047
Median	18.1	6.4	3.6	2.0	1.2	0.81	0.51	0.29	0.17	0.11	0.069	0.047
Min	0.89	0.49	0.31	0.14	0.14	0.14	0.088	0.022	0.012	0.014	0.017	0.020
Max	52.6	21.9	16.4	8.6	6.3	4.5	4.0	2.7	1.9	1.5	0.19	0.20

3.1.2 Combined spray drift data from Germany and The Netherlands

The German and Dutch spray drift datasets are joined together. The deposition values for the German, the Dutch and the joined dataset are presented as a double exponential curve fit (Figure 6) and a power-law curve fit (Figure 7) showing the average, median and 90th-percentile data. The power-law curve fit is similar to those presented as the Basic Drift Values (Rautmann *et al.*, 2001). The double exponential curve fit is similar to those presented in Holterman & Zande, 2008; Groot *et al.*, 2012 and Zande *et al.*, 2012.

Double exponential curve fit

From the spray drift analysis of Zande *et al.* (2012) the double exponential curve appeared to fit the experimental data well. Especially because of the steep decline of the spray drift deposition close to the field edge the double exponential curve appeared to fit better than the earlier used power law function. Therefore the double exponential curve fit is used in this analysis also.
The double exponential curve fit is expressed as:

$$y = a1 * \exp(x * b1) + a2 * \exp(x * b2)$$

where y = spray drift deposition (%); x = distance from treated area and a1, a2, b1 and b2 function parameters

Average, median and 90th-percentile spray drift deposition at different distances from the treated zone of the sprayed low crop (<20 cm) or bare soil surface from Germany, The Netherlands and the joined datasets and their spray drift curves fitted as double exponential functions are presented in Figure 6 and Table 7. The parameters of the double exponential functions are presented in Table 6. As expected, based on the number of measurements done in Germany (200) and in The Netherlands (48) the joined spray drift curve is somewhere in between the curves for both countries separately. Up to 3 m distance from the edge of the crop or the field the joined spray drift curve follows closer to the Dutch curve, at distances from 3 onward the spray drift curve is more or less in the middle of the two separate datasets, whereas from 10 m onwards the curve follows the German data.

Table 6. Fitted parameters for the double exponential function of the average, median and 90th-percentile spray drift curves of the sprayed low crop (<20 cm) or bare soil surface from Germany, The Netherlands and the joined datasets. Curves are fitted down to 30 m.

		DE-fit	NL-fit	DE/NL-fit
Average	a1:	28.2753	27.7898	18.1851
	b1:	-2.5730	-1.2939	-1.0701
	a2:	0.5128	1.4546	0.5553
	b2:	-0.0915	-0.1331	-0.0871
Median	a1:	27.9175	20.0271	15.9274
	b1:	-2.5275	-1.0581	-1.1852
	a2:	0.4395	0.6751	0.3720
	b2:	-0.0957	-0.1106	-0.0829
90-percentile	a1:	36.8158	45.3763	28.7358
	b1:	-2.4921	-1.1768	-0.8884
	a2:	0.9337	3.2938	0.8165
	b2:	-0.0860	-0.1405	-0.0758

Table 7. Average, median and 90th-percentile spray drift deposition (% of sprayed volume) from fitted double exponential spray drift curves based on the spray drift data from Germany, the Netherlands and the joined German-Dutch data ((DE-NL data) spraying a bare soil surface or short crop (<20 cm) using a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) and a boom height of 0.50 m at different distances form the treated zone.

	1 m	3 m	5 m	10m	15 m	20 m	25 m	30 m
Average								
Germany	2.626	0.402	0.325	0.205	0.130	0.082	0.052	0.033
Netherlands	8.893	1.549	0.791	0.385	0.198	0.102	0.052	0.027
DE-NL data	6.746	1.161	0.446	0.233	0.150	0.097	0.063	0.041
Median								
Germany	2.629	0.344	0.272	0.169	0.105	0.065	0.040	0.025
Netherlands	7.556	1.322	0.489	0.224	0.128	0.074	0.042	0.024
DE-NL data	5.211	0.745	0.288	0.162	0.107	0.071	0.047	0.031
90-percentile								
Germany	3.903	0.742	0.608	0.395	0.257	0.167	0.109	0.071
Netherlands	16.850	3.490	1.758	0.809	0.400	0.198	0.098	0.049
DE-NL data	12.576	2.650	0.897	0.386	0.262	0.179	0.123	0.084

Typically, the German and Dutch spray drift curves approach each other at 20 m and beyond. The decline of the curves originating from the Dutch dataset is slightly steeper than of the German dataset.
For the joined dataset average spray drift deposition values are 0.4% at 5 m, 0.23% at 10 m, 0.10% at 20 m and 0.04% at 30 m distance from the treated area. The 90th-percentile values are at 5 m distance 0.9%, at 10 m 0.39%, at 20 m 0.18% and at 30 m distance from the treated area 0.08%.

In general the 90th-percentile spray drift deposition values of the joined German-Dutch dataset are two times higher than the average data.

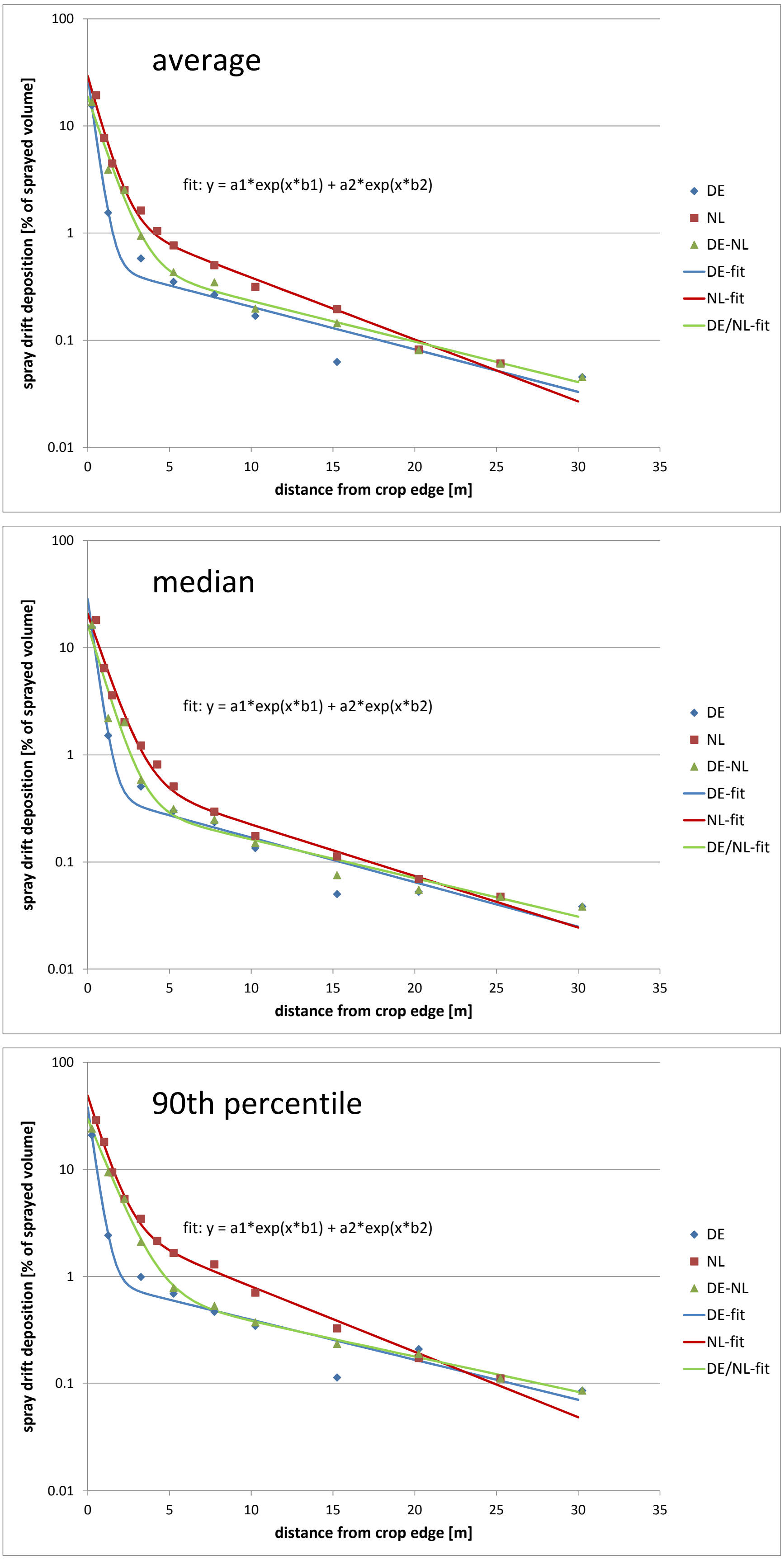

Figure 6. *Average, median and 90th-percentile spray drift deposition at different distances form the edge of the sprayed low crop (<20 cm) or bare soil surface from Germany, The Netherlands and the joined datasets and their spray drift curves fitted as double exponential functions.*

Power Law function curve fit

As presented by Rautmann *et al.* (2001) the results are also presented as a power law function (Figure 7). The Power Law function is expressed as:

$y = a \cdot x^b$

where y = spray drift deposition (%); x = distance from treated area; a and b are constants.

In Figure 7 the fitted power law functions of the average, median and 90th-percentile spray drift deposition values for the bare soil surface/short crop (<20 cm height) are presented. In Table 8 the fitted a and b parameters are presented of the average, median and 90-percentile curves. In Table 9 the estimated values of the average, median and 90th-percentile spray drift deposition at different distances from the treated area are presented based on the fitted power law functions for the German, the Dutch and the joined spray drift data.

Table 8. Fitted parameters for the power function of the average, median and 90-percentiles spray drift curves from Germany, The Netherlands and the joined datasets. For bare soil and short crop; fitted down to 30 m.

	DE		NL		DE-NL	
	a	b	a	b	a	b
Average	2.5455	-1.205	8.1100	-1.444	4.2133	-1.282
Median	2.4066	-1.270	6.6449	-1.518	3.1524	-1.307
90-percentile	3.9399	-1.106	16.187	-1.427	7.7707	-1.266

Estimated average spray drift deposition values based on the power law curve fit (Table 9) of the joined DE-NL deposition data for the spraying of a bare soil surface or a short crop (< 20 cm height) are 0.54% at 5 m, 0.22% at 10 m, 0.09% at 20 m and 0.05% at 30 m distance from the treated area. The estimated 90th-percentile spray drift deposition values based on the power law fit of the joined DE-NL spray drift deposition data are at 5 m 1.0%, at 10 m 0.42%, at 20 m 0.18% and at 30 m from the treated area 0.11%.

Table 9. Average, median and 90th-percentile spray drift deposition (% of sprayed volume) from fitted power law function spray drift curves based on the spray drift data from Germany, the Netherlands and the joined German-Dutch data ((DE-NL data) spraying a bare soil surface or short crop (<20 cm) using a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) and a boom height of 0.50 m at different distances form the treated zone.

	1 m	3 m	5 m	10m	15 m	20 m	25 m	30 m
Average								
Germany	2.546	0.677	0.366	0.159	0.097	0.069	0.053	0.042
Netherlands	8.110	1.660	0.794	0.292	0.162	0.107	0.078	0.060
DE-NL data	4.213	1.030	0.535	0.220	0.131	0.091	0.068	0.054
Median								
Germany	2.407	0.596	0.312	0.129	0.077	0.054	0.040	0.032
Netherlands	6.645	1.254	0.577	0.202	0.109	0.070	0.050	0.038
DE-NL data	3.152	0.750	0.385	0.155	0.092	0.063	0.047	0.037
90-percentile								
Germany	3.940	1.169	0.664	0.309	0.197	0.143	0.112	0.092
Netherlands	16.187	3.375	1.628	0.606	0.340	0.225	0.164	0.126
DE-NL data	7.771	1.934	1.013	0.421	0.252	0.175	0.132	0.105

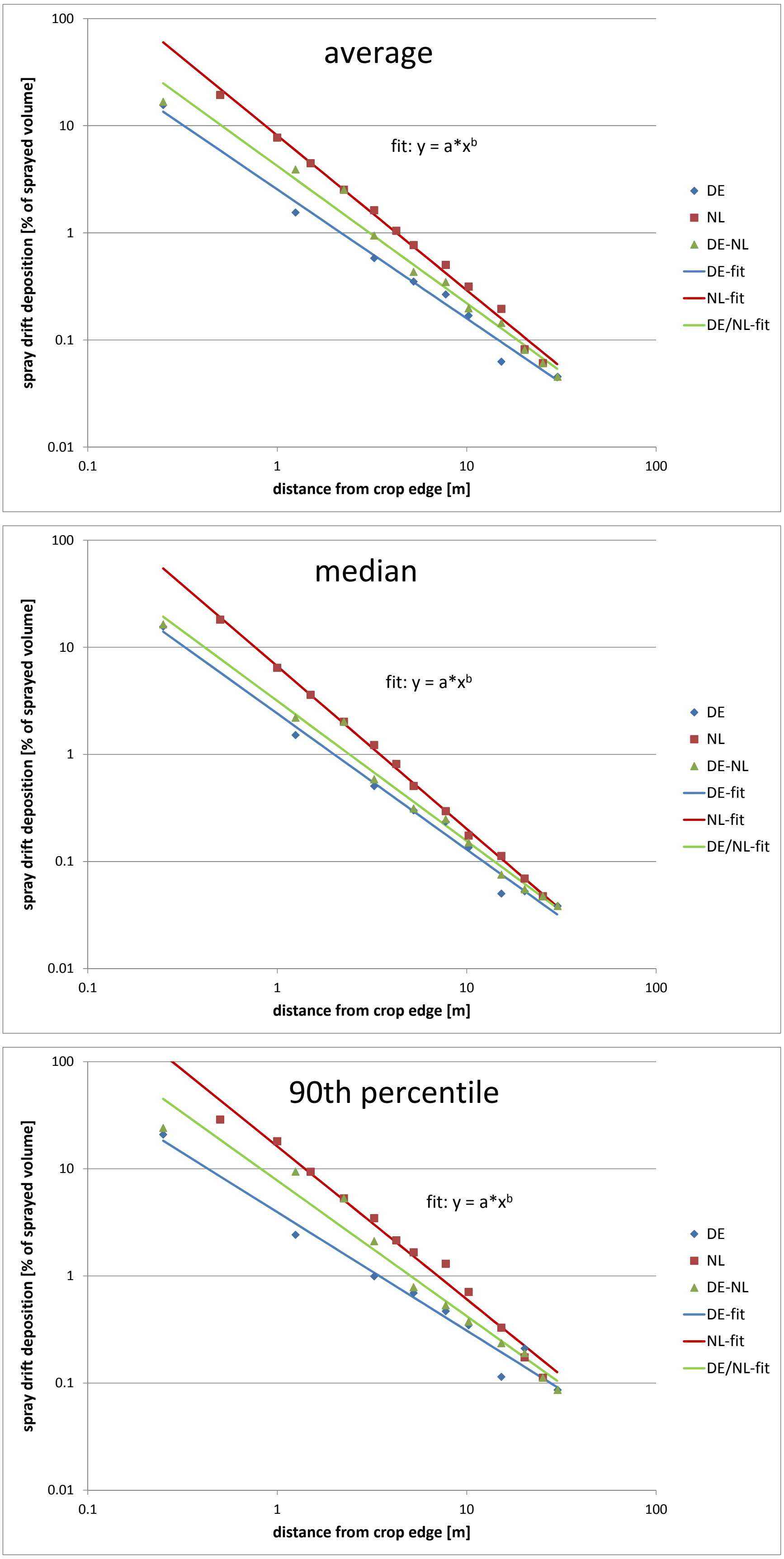

Figure 7. *Average, median and 90th-percentile spray drift deposition at different distances form the treated zone of a sprayed low crop (<20 cm) or bare soil surface from Germany, The Netherlands and the joined datasets and their spray drift curves fitted as power-law functions.*

Typically, a double-exponential curve and a power-law curve cross each other four times, due to the different mathematical structure of these curves. As an example, Figure 8 shows the fitted curves for the joined DE/NL data for bare soil. The power-law fits exceed the double-exponential at short distances (<1 m), at intermediate distances (4-8 m) and at large distances (>22 m). The position of these cross-overs may differ for different fits, but they follow the same qualitative pattern. When the fits do not include data points beyond 30 m, the differences appear to be relatively small.

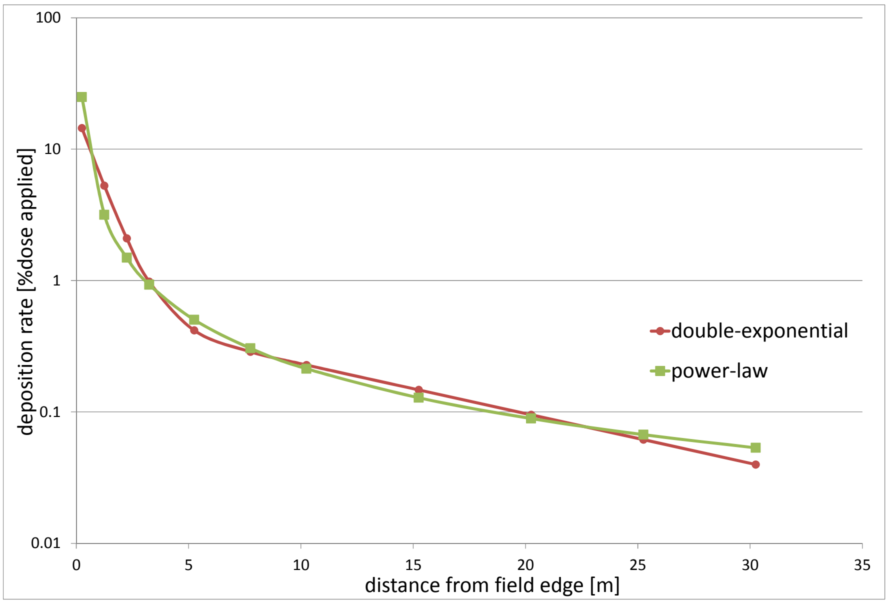

Figure 8. *Typical curves for double-exponential and power-law fit, showing four cross-overs (bare soil fits, DE+NL).*

For comparison of the fitted curve types, the average deviation of fitted values from measured depositis can be determined. The RMS value of log-deposits seems appropriate:

$$RMS = SQRT(SUM((LN(Y_{fx}) - LN(Y_{mx}))^2) / N_m)$$

Where Y_{fx} is the fitted deposit at distance x, Y_{mx} the measured deposit at that distance, N_m the number of deposits (i.e. distances). RMS is a measure of the average deviation in LN(Y). Table 10 shows these RMS values of the fitted curves for bare soil/short crop. For the German data, the RMS for power-law curves is smaller than those for double-exponential curves, indicating that the power-law curves fit slightly better. For the Dutch data and the joined DE-NL data, both curves seem to fit equally well.

Table 10. *RMS of differences in log(deposits) for fitted values compared to measured deposits for spray drift next to bare soil/short crops.*

RMS	DE		NL		DE-NL	
	Doub-exp	Power-law	Doub-exp	Power-law	Doub-exp	Power-law
avg	0.30	0.19	0.14	0.14	0.15	0.23
median	0.33	0.19	0.19	0.06	0.28	0.22
90th pct	0.31	0.25	0.10	0.22	0.08	0.33

3.2 Spray drift spraying a crop

3.2.1 Spray drift data from Germany and The Netherlands

Spray drift data from Germany
From spraying a cereal crop limited data (3 experiments of 6 repetitions = 18 measurements) are available from the German spray drift database. The measurements for spraying a cropped area with a boom sprayer equipped with standard flat fan nozzles (XR11004) are presented in Figure 9 and Table 11. Measurements were done down to a distance of 30 m from the treated area.

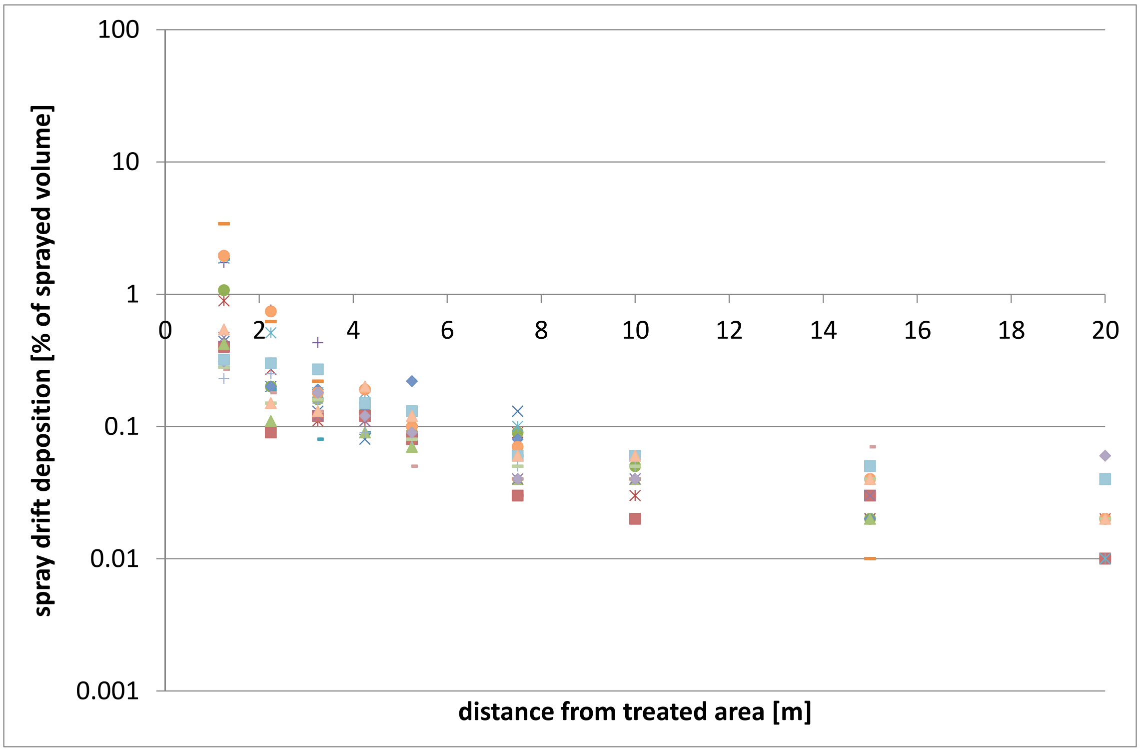

Figure 9. Spray drift deposition (% of sprayed volume) at downwind distances from the treated area of a sprayed cereal field, German data for a boom sprayer equipped with standard flat fan nozzles (XR11004) (18 measurements).

Based on the German data for a crop canopy spraying the average spray drift deposition at 1 m distance from the treated area of the crop is 0.93% ranging from 0.23% to 3.4%. At 5 m distance spray drift deposition is reduced to 0.10% (0.05%-0.22%) and at 10 m and 20 m distances to 0.05% (0.02%-0.06%) and 0.02% (0.01%-0.06%), respectively. In general the German spray drift deposition data spraying a bare soil surface or short cut grass are 3 to 4 times higher than spraying a cereal crop.

Spray drift data from The Netherlands
The Dutch spray drift measurements for the boom sprayer equipped with standard flat fan nozzles XR11004 and a fully developed arable crop (250 measurements) are presented in Figure 10 and Table 12. Measurements were done down to a distance of 15 m from the field edge.

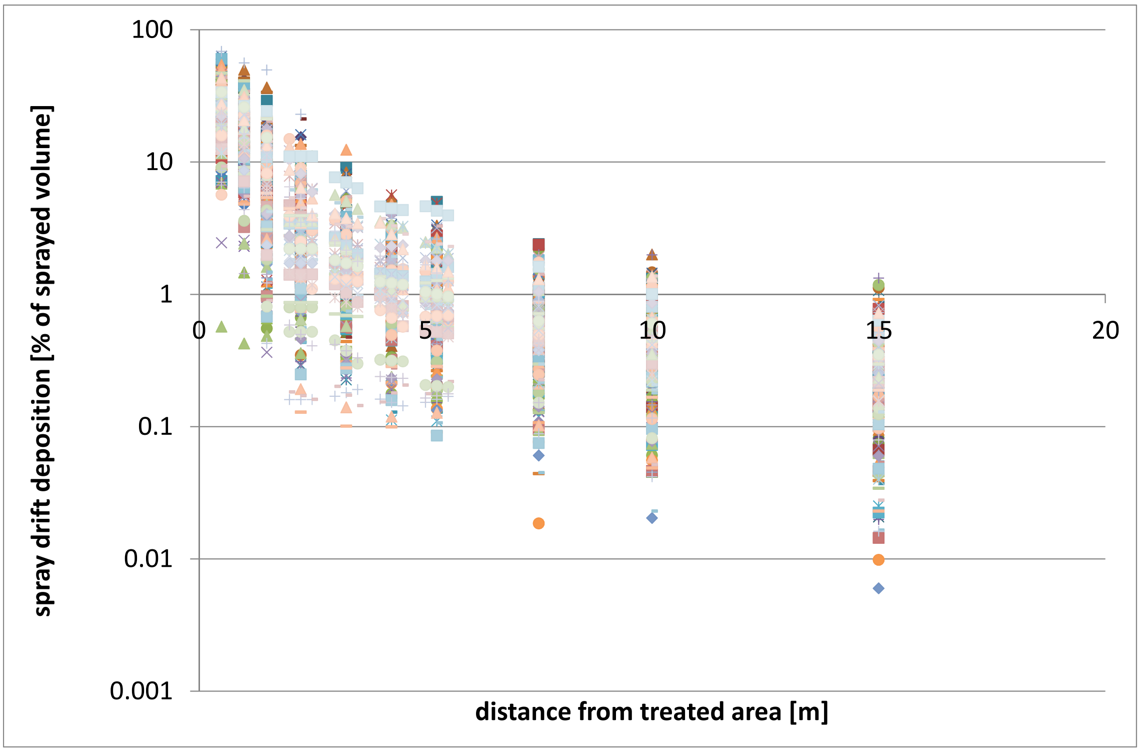

Figure 10. *Spray drift deposition (% of sprayed volume) at downwind distances from the treated area of a field growing an arable crop, Dutch data for a boom sprayer equipped with standard flat fan nozzles (XR11004) (250 measurements).*

Based on the Dutch data when spraying an arable crop, spray drift deposition at 1 m distance from the treated area of the crop is 17.4% ranging from 0.4% to 66%. At 5 m distance deposition is reduced to 1.2% (0.2%-4.6%) and at 10 m and 15 m distance from the treated area the deposition is 0.5% (0.02%-2.0%) and 0.3% (0.0%-1.3%), respectively.
In general the spray drift deposition from The Netherlands for spraying a cropped field are 2 times higher than that for spraying a bare soil surface or short crop (<20 cm).

Clearly the average spray drift deposition from the Dutch dataset is higher than the average of the German dataset. The Dutch data for the cropped situation are about ten times higher than the German spray drift deposition data at the different distances from the field edge. Close to the field edge (at 1 m and 3 m) the Dutch spray drift deposition data are about 20 to 25 times higher than the German spray drift data.

Table 11. *Spray drift deposition (% of sprayed volume) at downwind distances from the treated area of a sprayed field, German data for a boom sprayer equipped with standard flat fan nozzles (XR11004), and its standard deviation, median, minimum and maximum values.*

	1.25 m	2.25 m	3.25 m	4.25 m	5.25 m	7.75 m	10.25 m	15.25 m	20.25 m	30.25 m
Nr meas.	18	18	18	18	18	18	18	18	18	18
Average	0.93	0.31	0.17	0.13	0.10	0.06	0.05	0.03	0.02	0.02
Std	0.88	0.21	0.08	0.03	0.04	0.03	0.01	0.02	0.01	0.02
Median	0.46	0.23	0.16	0.13	0.09	0.06	0.04	0.03	0.02	0.02
Min	0.23	0.09	0.08	0.08	0.05	0.03	0.02	0.01	0.01	0.01
Max	3.4	0.76	0.43	0.20	0.22	0.13	0.06	0.07	0.06	0.07

Table 12. *Spray drift deposition (% of sprayed volume) at downwind distances from the crop edge of a sprayed field, Dutch data for a boom sprayer equipped with standard flat fan nozzles (XR11004), and its standard deviation, minimum and maximum values.*

	0.50 m	1 m	1.75 m	2 m	2.25 m	2.75 m	3 m	3.25 m	3.75 m	4 m	4.25 m	4.75 m	5 m	5.25 m	5.5 m	7.75 m	10 m	15 m
Nr.meas	250	250	250	40	250	40	40	249	40	40	249	40	40	250	40	250	250	250
Average	27.4	17.4	8.0	4.5	3.5	3.1	2.3	2.0	1.9	1.5	1.4	1.3	1.2	1.1	1.1	0.7	0.5	0.3
Std	13.0	9.2	6.8	3.8	3.3	2.5	1.5	1.7	1.2	1.0	1.0	0.9	0.8	0.8	0.7	0.5	0.4	0.2
Median	25.4	16.1	5.8	3.4	2.5	2.6	1.9	1.5	1.7	1.2	1.1	1.1	1.0	0.8	0.9	0.5	0.4	0.2
Min	0.6	0.4	0.4	0.16	0.13	0.16	0.17	0.10	0.14	0.15	0.10	0.14	0.15	0.09	0.17	0.02	0.02	0.00
Max	68.5	56.1	49.7	14.9	22.9	11.1	7.7	12.4	6.3	4.6	5.6	4.3	4.6	5.0	3.9	2.4	2.0	1.3

3.2.2 Combined spray drift data from Germany and The Netherlands

The German and Dutch spray drift datasets are joined together. The average, median and 90th-percentile spray drift deposition values for the German, the Dutch and the joined dataset are presented. A distinction is made in double exponential curve fits and power law function curve fits as earlier presented for presentations of the spray drift data from The Netherlands (Holterman & Zande, 2008; Groot *et al.*, 2012; Zande *et al.*, 2012) and Germany (Rautmann *et al.*, 2001).

Double exponential curve fit

Average, median and 90th-percentile spray drift deposition at different distances form the treated area of the sprayed crop (>20 cm height) from Germany, The Netherlands and the joined datasets are presented in Figure 11 fitted as double exponential functions. The parameters of the double exponential functions are presented in Table 14. In Table 13 the estimated values of the double exponential curve fits of the average, median and 90th-percentile data are presented for the German, the Dutch and the joined DE-NL data. As expected based on the number of measurements done in Germany (18) and in The Netherlands (250) the joined DE-NL spray drift curve is almost identical to the Dutch spray drift curve for a cropped situation.

Table 13. Estimated average, median and 90th-percentile spray drift deposition (% of sprayed volume) from fitted double exponential spray drift curves based on spray drift data from Germany, the Netherlands and the joined German-Dutch data ((DE-NL data) spraying a crop (>20 cm) using a boom sprayer equipped with standard flat fan nozzles (XR11004) and a boom height of 0.50 m above crop canopy at different distances form the treated area of the crop.

	1.0 m	3.0 m	5.0 m	10.0m	15.0 m	20.0 m	25.0 m	30.0 m
Average								
Germany	0.947	0.229	0.091	0.048	0.037	0.028	0.022	0.017
Netherlands	31.292	2.706	1.076	0.530	0.278	0.146	0.076	0.040
DE-NL data	30.257	2.601	1.020	0.499	0.261	0.136	0.071	0.037
Median								
Germany	0.446	0.191	0.097	0.042	0.030	0.023	0.018	0.014
Netherlands	29.850	1.872	0.895	0.433	0.214	0.106	0.052	0.026
DE-NL data	29.099	1.787	0.853	0.411	0.202	0.099	0.049	0.024
90-percentile								
Germany	2.188	0.362	0.119	0.070	0.058	0.049	0.041	0.034
Netherlands	58.684	5.634	2.154	1.063	0.571	0.306	0.164	0.088
DE-NL data	58.304	5.505	2.108	1.042	0.558	0.299	0.160	0.086

For the average spray drift deposition data the decline of the curve originating from the Dutch dataset is steeper than that of the German dataset. However, the curves approach each other at larger distances.

For the joined DE-NL dataset average spray drift deposition values are 1.0% at 5 m, 0.5% at 10 m, 0.14% at 20 m and 0.04% at 30 m distance from the treated area. The 90th-percentile values are at 5 m distance 2.1%, at 10 m 1.0%, at 20 m 0.3% and at 30 m distance from the treated area 0.09%.

In general the 90th-percentile spray drift deposition values of the joined German-Dutch dataset are two times higher than the average data.

Table 14. Fitted parameters for the double exponential function of the average, median and 90th-percentile spray drift curves from Germany, The Netherlands and the joined DE-NL datasets.

		DE-fit	NL-fit	DE/NL-fit
Average	a1:	2.02497	136.182	131.376
	b1:	-0.84347	-1.52627	-1.52284
	a2:	0.07963	1.92730	1.82775
	b2:	-0.05175	-0.12916	-0.12984
Median	a1:	0.64851	178.820	176.568
	b1:	-0.51621	-1.84322	-1.85506
	a2:	0.06176	1.77527	1.70097
	b2:	-0.04902	-0.14108	-0.14201
90-percentile	a1:	5.80034	234.619	235.751
	b1:	-1.02020	-1.44295	-1.45359
	a2:	0.10003	3.69224	3.62703
	b2:	-0.03613	-0.12449	-0.12478

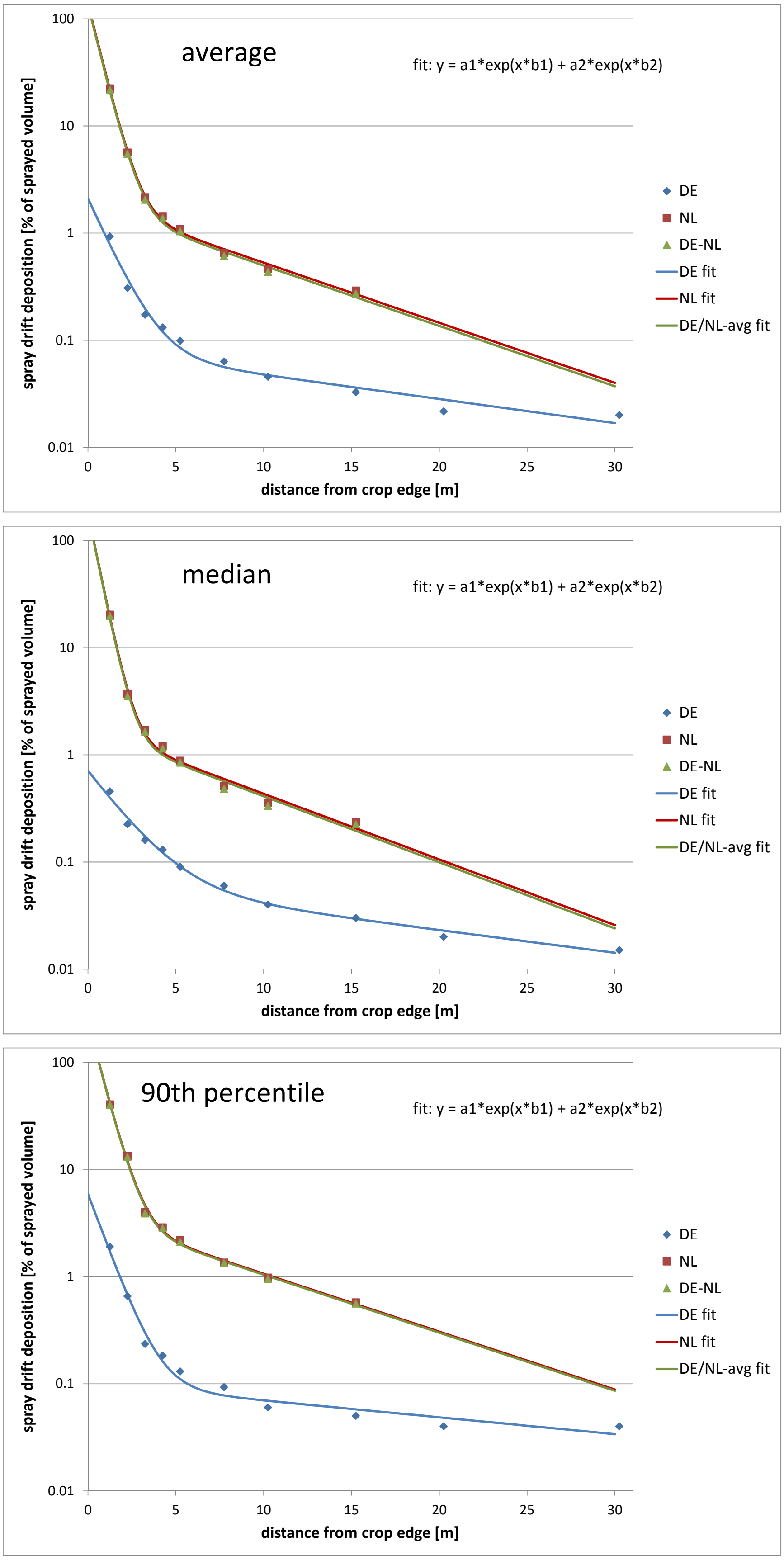

Figure 11. *Average, median and 90^{th}-percentile spray drift deposition at different distances form the treated area of the sprayed crop (>20 cm) from Germany, The Netherlands and the joined datasets and their spray drift curves fitted as double exponential functions.*

Power law function

As presented by Rautmann *et al.* (2001) the results are also presented as a power function (Figure 12) with the fitted a and b parameters presented of the average, median and 90-percentile curves in (Table 15) spraying a cropped area.

Table 15. Fitted parameters for the power law function of the average, median and 90-percentiles spray drift curves from Germany, The Netherlands and the joined DE-NL datasets spraying a cropped area.

	DE		NL		DE-NL	
	a	b	a	b	a	b
Average	0.8286	-1.1936	22.032	-1.701	21.422	-1.715
Median	0.5690	-1.0922	17.630	-1.708	17.111	-1.718
90-percentile	1.3715	-1.2079	43.102	-1.682	42.476	-1.685

In Table 16 the estimated values of the average, median and 90th-percentile spray drift deposition at different distances from the treated area are presented based on the fitted power law functions for the German, the Dutch and the joined DE-NL spray drift data.

Table 16. Estimated spray drift deposition (% of sprayed volume) from fitted power law function spray drift curves based on spray drift data from Germany, the Netherlands and the joined German-Dutch data ((DE-NL data) spraying a crop (>20 cm) using a boom sprayer equipped with standard flat fan nozzles (XR11004) and a boom height of 0.50 m above crop canopy at different distances from the treated area of the crop.

	1.0 m	3.0 m	5.0 m	10.0m	15.0 m	20.0 m	25.0 m	30.0 m
Average								
Germany	0.829	0.223	0.121	0.053	0.033	0.023	0.018	0.014
Netherlands	22.032	3.400	1.426	0.439	0.220	0.135	0.092	0.068
DE-NL data	21.422	3.255	1.356	0.413	0.206	0.126	0.086	0.063
Median								
Germany	0.569	0.171	0.098	0.046	0.030	0.022	0.017	0.014
Netherlands	17.630	2.700	1.128	0.345	0.173	0.106	0.072	0.053
DE-NL data	17.111	2.592	1.078	0.328	0.163	0.100	0.068	0.050
90-percentile								
Germany	1.372	0.364	0.196	0.085	0.052	0.037	0.028	0.023
Netherlands	43.102	6.792	2.876	0.896	0.453	0.279	0.192	0.141
DE-NL data	42.476	6.671	2.821	0.877	0.443	0.273	0.187	0.138

Estimated average spray drift deposition values based on power law curve fit (Table 16) of the joined DE-NL deposition data for spraying of a cropped area (> 20 cm height) are 1.4% at 5 m, 0.41% at 10 m, 0.13% at 20 m and 0.06% at 30 m distance from the treated area. The estimated 90th-percentile spray drift deposition values based on the power law fit of the joined DE-NL data are at 5 m 2.8%, at 10 m 0.88%, at 20 m 0.27% and at 30 m from the treated area 0.14%.

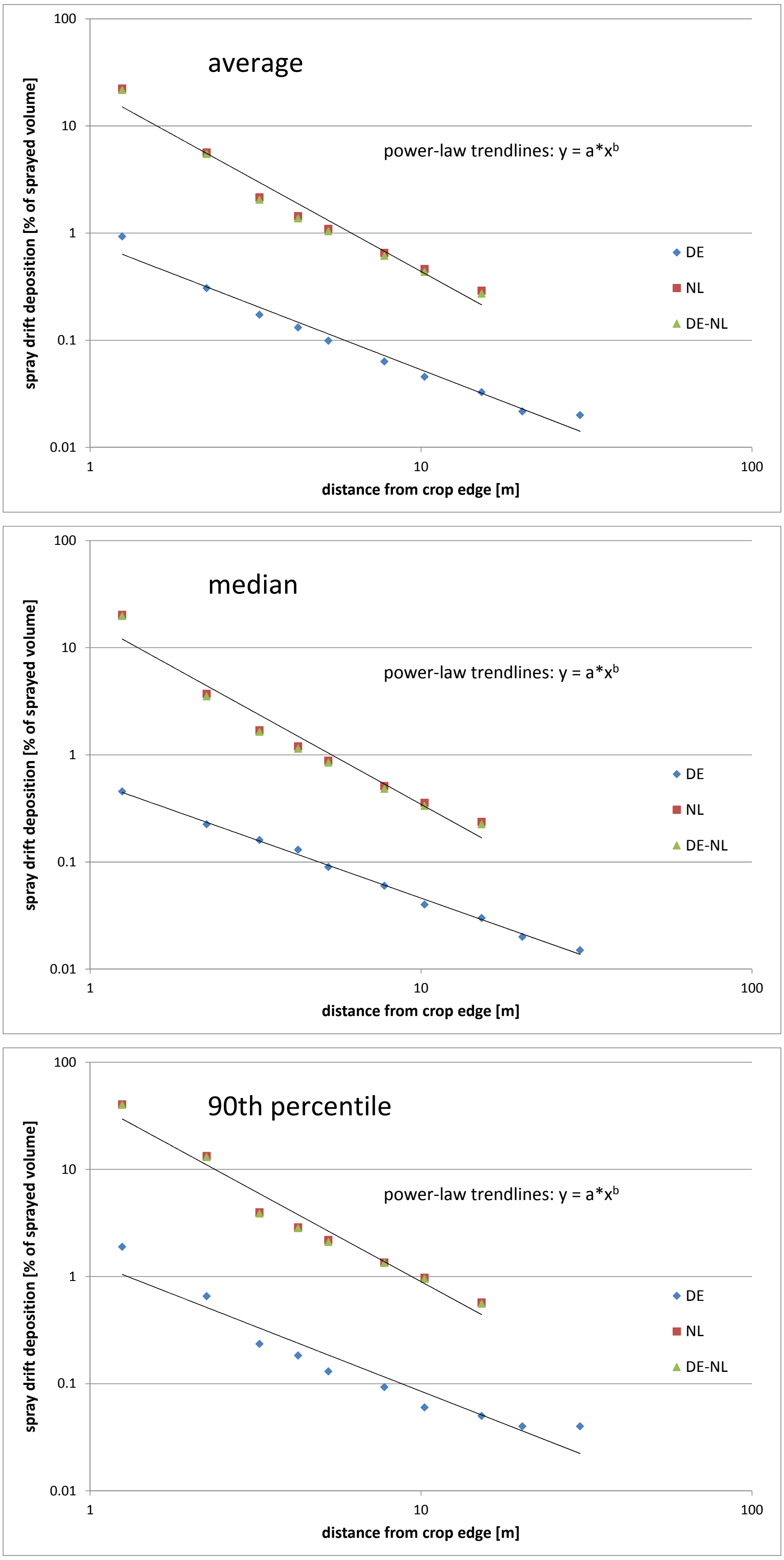

Figure 12. *Average spray drift deposition at different distances form the treated zone of a sprayed crop (crop height >20 cm) from Germany, The Netherlands and the joined datasets and their spray drift curves fitted as power functions.*

Similar to the previous Section, RMS values can be determined for deviations in LOG(depositis) in the cropped field situation to compare the drift curve types. Table 17 shows these RMS values of the fitted curves. For the German data, the RMS for power-law curves and double-exponential curves are similar. For the Dutch data, the RMS for the double exponential curves are smaller, indicating that the double exponential curves fit better. The same holds for the joined data, due to the fact that these data are governed by the larger number of Dutch data.

Table 17. RMS of differences in log(deposits) for fitted values compared to measured deposits for spray drift next to cropped fields.

RMS	DE		NL		DE-NL	
	Doub-exp	Power-law	Doub-exp	Power-law	Doub-exp	Power-law
avg	0.16	0.19	0.07	0.24	0.07	0.24
median	0.09	0.06	0.12	0.27	0.12	0.28
90^{th} pct	0.16	0.35	0.08	0.25	0.08	0.25

4. Discussion

The discrimination in a bare soil surface situation and a developed crop situation at a crop height of 20 cm is quite arbitrary and must be seen as a first attempt to introduce spray drift of boom sprayer applications dependent on crop type and growth stages like in dormant and full leaf applications for orchard spraying. Within the bare soil surface and short crop situation data are taken up of bare soil, mowed short grassland and cereal stubble from Germany and bare soil, and less than 20 cm high sugar beet, maize and wheat crops. Spray drift for these individual crops do differ however also within the dataset meaning that a future analysis can also be done taking these differences into account. Similarly for the crop growth situation the spray drift data from Germany are from cereal spraying and from the Netherlands contain data from potato, wheat, sugar beet, lilies and mustard. Zande *et al.* (2006) showed that the spray drift deposition at 2-3 m from the last nozzle is significantly different for these crop types with the highest spray deposition for a potato crop followed by maize, flower bulb, bare soil, sugar beet and cereal (Figure 13). Also for the crop situation a future analysis on this or an expanded dataset can be done taking these crop type differences into account. As nozzle position differs for these different crop types as it is related to the nozzle spacing on the spray boom (50 cm) and the position relative to the crop rows having a row spacing of 75 cm (potatoes, maize), 50 cm (sugar beet) and 25 cm (cereals) the edge of the crop canopy relative to the last nozzle differs per crop type. Moreover crop canopy structure and density differs also and filters spray and spray drift therefore also in different ways at the edge of the field. All of these aspects are to be looked upon in detail in further data analysis when more data are taken up in a future analysis.

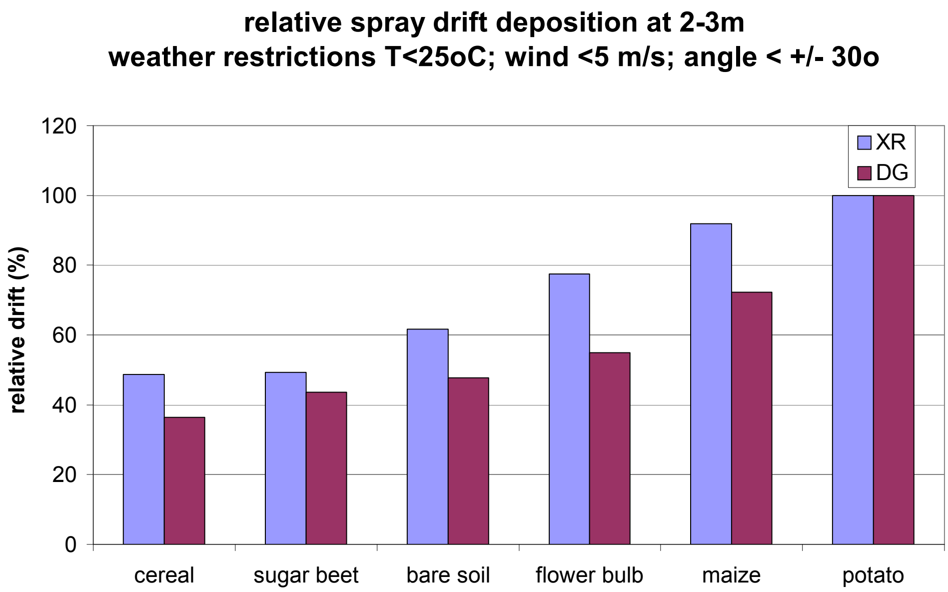

Figure 13. Effect of crop type on spray drift deposition at 2-3m distance from the last nozzle for a standard flat fan (XR11004; 300 l.ha-1) and a pre-orifice flat fan nozzle (DG11004; 300 l.ha-1) (after Zande et al., 2006).

For the bare soil surface situation the spray drift depositions from the Dutch dataset are close to the treated area higher than those of the German dataset. In general the Dutch data are in a similar range as the German data although average spray drift deposition is at the 1 m distance 5 times higher than the German. For the distances 5 m to 15 m Dutch spray drift deposition is two to three times higher than the German spray drift deposition at those distances from the field edge. From 20 m onwards Dutch spray drift data are equal or lower than the German data.

For the cropped situation the average spray drift deposition from the Dutch dataset is higher than the average of the German dataset. For the cropped situation the spray drift deposition values for the Dutch dataset are about ten times higher than those for the German dataset. Especially close to the field edge (at 1 m and 3 m distances) the Dutch deposition data are about 20 to 25 times higher than the German spray drift data.
Estimated average, median and 90th-percentile values are presented for spraying a bare soil surface or short crop (<20 cm crop height) and spraying a developed crop (> 20 cm crop height), based on two curve fit procedures: double exponential and power law.

The estimated spray drift deposition data based on the double exponential curve fit is presented in Table 18 and Figure 15 for the average, median and 90th-percentile values with distance from the treated field. For the power law function the estimated spray drift deposition are presented in Table 19 and Figure 16.

Table 18. Estimated average, median and 90th-percentile spray drift deposition (% of sprayed volume) downwind of a sprayed bare soil surface/short crop and a crop situation based on joined spray drift data from Germany and The Netherlands (double exponential curve fit).

	1 m	3 m	5 m	10m	15 m	20 m	25 m	30 m
Average								
Bare soil	6.7	1.2	0.4	0.23	0.15	0.10	0.06	0.04
Crop	30.3	2.6	1.0	0.5	0.26	0.14	0.07	0.04
Median								
Bare soil	5.2	0.7	0.3	0.16	0.11	0.07	0.05	0.03
Crop	29.1	1.8	0.9	0.41	0.20	0.10	0.05	0.02
90-percentile								
Bare soil	12.6	2.7	0.9	0.39	0.26	0.18	0.12	0.08
Crop	58.3	5.5	2.1	1.0	0.56	0.30	0.16	0.09

The remarkable difference in spray deposition from the Dutch and German dataset spraying a crop may be due to weather conditions during measurements (mean wind speed Germany 1.7 m/s and the Netherlands 3.3 m/s, the wind angle and temperature), but crop types differ as well (Germany cereals GS42-45 and The Netherlands mainly potatoes (crop height 50-80 cm). Comparative measurements in different crop types showed that spray drift with a cereal crop was about 50% lower than that with a sprayed potato crop (Zande *et al.*, 2006).
In order to know whether the difference in amount of spray drift deposition between the Dutch and the German crop dataset can be caused by a difference in wind speed the Dutch dataset is grouped in measurements with wind speeds < 2m/s, 2-4 m/s, and >4 m/s (Figure 14). Whereas the maximum wind speed in the German crop dataset is 2 m/s similar data are taken from the Dutch data set showing that spray drift is lower with reduced wind speeds. Although the Dutch spray drift curve for the wind speed lower than 2 m/s comes closer to the German one but is still 3 times higher. This means other factors are still relevant. Factors affecting the spray drift data may also origin from the field conditions; sprayer type (DE: mounted, NL: trailed), spray boom width (DE: 10 m, NL 24 m), width sprayed area (DE: 20 m – 2 swaths of 10 m, NL 24 m – 1 swath), sprayer boom movement during application, crop and ground conditions over which the measurements were made. Another source for different spray drift deposition values may be the spray solutions used during the spray drift measurements. The DE spray drift measurements were done with just water (BBA, 1992) whereas the NL measurements were done using water and a surfactant (TCT, 2003; ISO 22866). As water gives less drops < 100 µm than water + surfactant (Agral; IPARC, 2014) spray drift potential is for the DE measurements also lower than for the NL situation. Also the sizes and characteristics of the collectors used (DE: filter paper strips, NL: filter collector) and measurement methodologies used in the two studies may be a source of differences in height of the spray drift deposition values. Mathers *et al.*, 2000 and DEFRA (2003) show that the spray drift deposition at ground surface was for filter paper strips 3 to13 times higher than for petri dishes depending on distance from the treated field. It is therefore recommended to make comparative drift

measurements with the same sprayer and spray drift protocols (ISO22866) and collectors as used (petri dishes, filter paper strips, filter material) in both studies on bare soil and a crop situation to clarify any differences of this source.

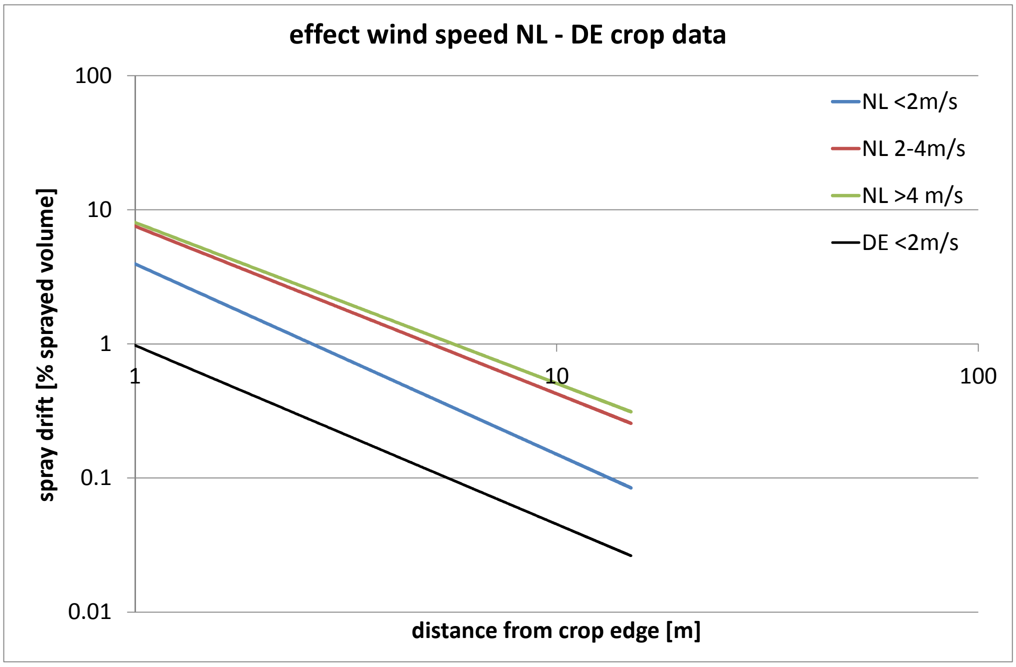

Figure 14. *Effect of wind speed (< 2 m/s, 2-4 m/s, >4 m/s) on spray drift deposition for the Dutch crop situation compared to the German crop data (wind speed max 2 m/s).*

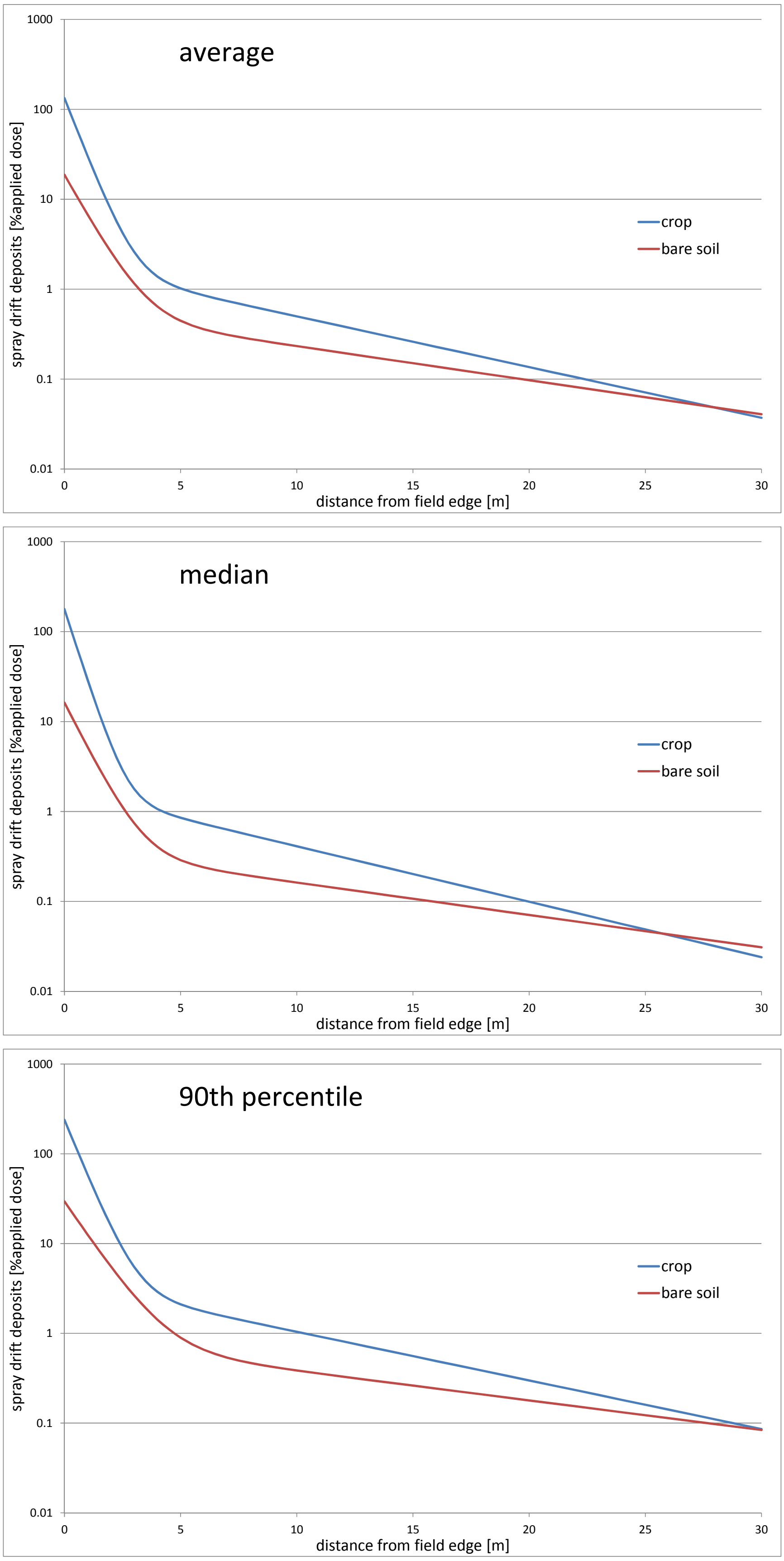

Figure 15. Average, median and 90th-percentile spray drift deposition next to sprayed bare soil surface/short crop and a crop situation based on joined drift data from Germany and The Netherlands (double exponential curve fit).

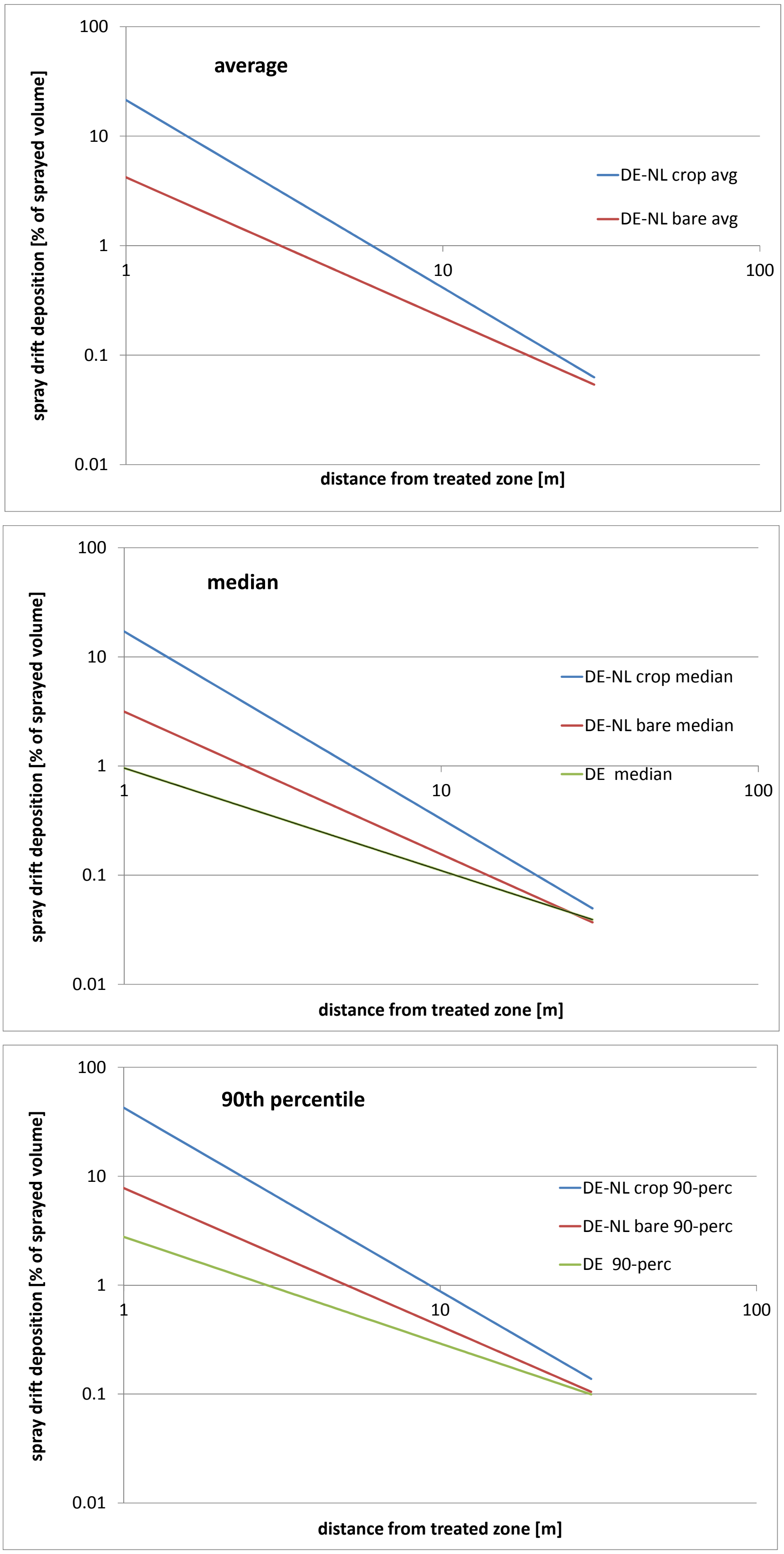

Figure 16. *Power law function of average, median, 90th-percentile spray drift deposition next to sprayed bare soil surface/short crop and a crop situation based on joined drift data from Germany and The Netherlands in comparison with German basic drift values (median, 90-percentile).*

In Table 19 and Figure 16 a comparison is made between the German median and 90th percentile spray drift values (Rautmann *et al.*, 2001) and the joined German-Dutch drift values. The values of the basic drift values are very similar to those found now for the median values of the bare soil situation. The now generated 90th-percentile values for the bare soil situation are in general for the distances of 1 m to 5 m from the treated area 2.5 times to 2 times higher than the basic drift values at those distances. From 15 m onwards the spray drift values for the bare soil situation generated in this study are similar to the basic drift values. For the cropped situation the spray drift values are 15 times higher at 1 m distance from the treated area and decreasing to similar values at 20 m and further distances from the treated area.

Table 19. *Estimated average, median and 90th-percentile spray drift deposition (% of sprayed volume) downwind of a sprayed bare soil surface/short crop and a crop situation based on joined spray drift data from Germany and The Netherlands (power law function) and German basic drift values.*

	Distance from treated area [m]							
	1	3	5	10	15	20	25	30
DE-NL crop avg	21.4	3.3	1.4	0.41	0.21	0.13	0.09	0.06
DE-NL bare avg	4.2	1.0	0.54	0.22	0.13	0.09	0.07	0.05
DE-NL crop median	17.1	2.6	1.1	0.33	0.16	0.10	0.07	0.05
DE-NL bare median	3.15	0.75	0.38	0.16	0.09	0.06	0.05	0.04
DE mean	0.97	0.34	0.21	0.11	0.07	0.06	0.05	0.04
DE-NL crop 90-perc	42.5	6.7	2.8	0.88	0.44	0.27	0.19	0.14
DE-NL bare 90-perc	7.77	1.93	1.01	0.42	0.25	0.18	0.13	0.10
DE 90-perc	2.77	0.95	0.57	0.29	0.20	0.15	0.12	0.10

Differences in spray drift between spraying a bare soil surface or a cropped situation is probably mainly caused by the higher release height of the spray in the cropped situation. Sprayer boom height of 50 cm above a crop height of e.g. 50-70 cm height releases the spray at 1.2m height. Average wind speed at 1.2 m height (even above a crop canopy) is higher than that at 50 cm height above a bare soil surface due to a logarithmic increasing wind speed profile with height. Apart from the wind speed effect also the nozzle position relative to the crop border influences spray drift deposition next to the treated field. Overspray of the spray fan of the outside nozzle is likely to occur in the first 2 m next to the sprayed crop, because of the wide top angle of the nozzles used (110°). From a study comparing spray drift with a cereal crop and a bare soil surface it was concluded that spraying a cereal crop higher spray drift values are observed than spraying a bare soil surface under similar weather conditions (Stallinga *et al.*, 1999).

In this study a compilation is done based on spray drift field measurements for boom sprayers equipped with standard flat fan nozzles (XR11003/XR11004) and a spray boom height of 50 cm from Germany and The Netherlands. An expansion of this dataset with spray drift data from other member states (e.g. UK, BE, DK, SE, FR, IT) is possible and will lead to a more robust set of general spray drift curves. Further statistical analysis is than needed also on the preference of the curve-fit procedures.

If the estimated curves for deposition of spray drift based on the joined data of Germany and The Netherlands as described in this study, are to be used in the authorisation process, consequently the drift mitigation measures start at a higher reference level of spray drift. When the double exponential curves for the bare soil surface and the cropped situation are used a 90% drift reducing technology will be evaluated with a spray drift deposition value of 0.1% at 5 m distance for the bare soil surface situation and 0.2% for the cropped situation.

In the bare soil surface situation a 1% level of the standard spray technique is met at 5 m distance whereas in the cropped situation it is met at 10 m distance. Similar differences in buffer zone width can occur for drift reducing technologies depending on the spray drift threshold level to be met between cropped and bare soil surface situations.

Recommendations

1. An understanding of the effect of collector type on drift values is long overdue. Clearly the NL approach (filter material) captures more of the depositing spray drift than the DE approach (filter paper strips or nowadays petri dishes). However, there is currently no way to decide which is the more appropriate for the purpose of developing a risk assessment (surface water, non-target plants). There are clear differences, supported by some limited research (DEFRA, 2003, Mathers *et al.*, 2000). Very clearly, this subject needs to be properly understood if any attempt is to be made to properly combine all the EU drift data.
2. The effect of crop – whether a cover such as stubble or mown grass, or a true crop such as cereals or sugar beet or potatoes – has a very large effect on spray drift. Some crops clearly increase the spray drift (e.g., potatoes); others filter drift (e.g., cereals).
   However, there is no data covering the range of growth stages in a given crop and this is a seriously large information gap. At the moment, without going into, say, the Belgian, UK, or French drift data sets in detail, only potatoes at a full canopy have been explored fully. Assessments of the influence of crop should consider, at a minimum;
   i. Foliar morphology effects on filtering
   ii. Foliar influences of spray drift dynamics beyond end nozzle.
   iii. Relationship to definition of edge of field
   iv. Crop influences on air flow turbulence (particularly in the 'near Edge of field' range)
3. Location of the last nozzle to the edge of field or crop is clearly very important for boom spray drift from arable crops. As the spray deposition at 1 m to 2 m downwind is largely driven by overspray, this issue becomes important and is another area that urgently needs research. The 'oversprayed' area is likely even greater with increasing wind speed.

Further research on the above topics would not only give the research and regulatory community a clearer view of what drift really is, but it should open up three important possibilities:

1. The ability to reliably combine more data sets from other countries, covering different climates and crops, as well as the protocols used in the measurements.
2. How to address the issue of overspray versus spray drift.
3. Calibration of spray drift models such that drift data can be interpolated – perhaps even extrapolated – to cover crops, growth stages, equipment, and spraying conditions not originally covered.

5. Conclusions and recommendations

The work reported here is, to the authors knowledge, the first large scale attempt to consider two large drift data sets, both designed for the common purpose of providing drift values for environmental fate risk assessments, and to determine whether or not it is possible to combine such national data sets to provide pan-European drift values. As a starting point, two well-known drift data sets – from Germany and the Netherlands – were combined as a basis for illustrating the possible path forward and in order to enable a better understanding of key limitations that will need to be overcome in future.

Following ISO22866 (2005) and ISO22369-2 (2006) a reference spray application was defined as a boom spray application with a boom height of 0.50 m above bare soil or crop canopy, a nozzle type close to the BCPC Fine/Medium threshold nozzle, and a driving speed of 6-8 km/h. Spray drift data from a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) and a spray boom height of 0.50 m above soil surface or crop canopy were analysed. The analysis of the joined spray drift data for this subset of data results in separate spray drift curves for the bare soil surface (crop height < 20 cm) or short crop situation and the cropped situation (crop height > 20 cm).

Results from the joined spray drift datasets show average spray drift deposition values are 0.51% for the bare soil surface and 1.0% for the crop situation at 5 m distance from the treated area using the double exponential curve fit. Similarly, using a power-law curve fit, spray drift deposition values of 0.54% for the bare soil surface and 1.4% for the developed crop situation are obtained.

The newly generated spray drift curves result in a 90th-percentile spray drift deposition value at 5 m distance from the treated area of 1.0% in the bare soil situation and 2.1% in the developed crop situation when using the double exponential curve fit and 1.0% and 2.8%, respectively, when using the power-law curve fit. The presently used German Basic Drift Values, which are also used in the EU authorisation procedure, show a spray drift deposition value of 0.57% at this distance.

Several clear lessons were learned from this exercise, which lead directly into important research questions if arable crop spray deposition is to be properly explored and understood.

First, protocol differences can have a large effect on spray drift deposition capture (filter paper strips vs synthetic filter material). However, it is not clear at all if one protocol is to be preferred over another, nor if one protocol is suitable for all off-crop situations (*e.g.*, surface water *v.* capture by low vegetation *v.* capture by hedges). There is a clear research need.

Second, the effect of even a cover crop is variable and poorly understood. Even small differences in cover crop (*e.g.*, from bare soil to mown grass) would appear to affect spray drift deposition from bare ground. Much larger differences were observed when spray drift was measured from applications over crops. Some crops increased spray drift deposition, others filtered spray drift. A clear research need is to understand spray drift over crops, and to determine effect of growth stage of crop on spray drift. It is recommended that representations of influence of crop on spray drift needs a more thorough investigation and further statistical analyses (e.g. mixed model analysis) to incorporate the effects of crop type, crop growth stage and wind speed and wind direction on spray drift deposition.

Third, the effect of where the last nozzle is located differs per crop type and has important implications on spray drift deposition downwind of the sprayed field. As the spray deposition at 1 m to 2 m downwind of the field edge is largely driven by overspray. The effect of crop foliar morphology and canopy filter needs further research.

Fourth, to the authors knowledge, powerful statistical techniques have not been attempted on spray deposition drift values for the simple reason that powerful statistical tools tend to need large data sets. However, as there are clear dynamic differences between the two data sets assessed, whether between countries (*i.e.*, protocols) or between crops, an important first step is to assess the differences between protocols and find a means of bridging the data. Only then can the data sets be reliably combined, and this applies especially to further combining other EU data sets.

As a next step in this research, the authors would recommend a focussed attempt at understanding the differences between the various data sets. This would include the following:

1. An assessment of at least two more large scale arable crop spray drift deposition data sets to see if the lessons learnt from this analysis also applies to other work.
2. A set of highly targeted field trials in different parts of the EU, under a tightly specified protocol, looking at the various deposition drift capture approaches. With this research, it may be possible to 'standardise' various existing data sets, with a view to a standard data set for modelling calibration and validation.
3. An EU-wide workshop bringing all the available data and new research together to decide if pan-EU spray drift values (as a first step for arable crops) can be derived by combining different spray drift data sets.

Summary

The work reported here is, to the authors knowledge, the first large scale attempt to consider two large spray drift data sets, both designed for the common purpose of providing spray drift values for environmental fate risk assessments, and to determine whether or not it is possible to combine such national data sets to provide pan-European spray drift values. As a starting point, two well-known spray drift data sets – from Germany and the Netherlands – were combined as a basis for illustrating the possible path forward and in order to enable a better understanding of key limitations that will need to be overcome in future.

Spray drift data from Germany and The Netherlands were used to generate spray drift deposition curves for a defined reference situation spraying a bare soil surface or short crop situation (crop height lower than 20 cm) and a cropped situation (crop height higher than 20 cm). Following ISO22866 and ISO22369-2 a reference spray application was defined as a boom spray application with a boom height of 0.50 m above bare soil or crop canopy, a nozzle type close to the BCPC Fine/Medium threshold nozzle, and a driving speed of 6-8 km/h. Spray drift data from both the Netherlands and Germany from a boom sprayer equipped with standard flat fan nozzles (XR11003/XR11004) and a spray boom height of 0.50 m above soil surface or crop canopy were analysed. The analysis of the joined spray drift data results in separate spray drift curves for the bare soil surface or short crop situation and the cropped situation. The data for the cropped situation are however merely from The Netherlands.

The here generated spray drift curves result in a 90^{th}-percentile spray drift deposition value at 5 m distance from the treated area of 1.0% in the bare soil situation and 2.1% in the developed crop situation when using a double exponential curve fit and 1.0% and 2.8%, respectively, when using a power-law curve fit. The presently used German Basic Drift Values, which are also used in the EU authorisation procedure, show a spray drift deposition value of 0.57% at this distance. Especially because spray drift values are evaluated as 90^{th} percentiles the higher Dutch spray drift results dominate the joined spray drift curves and lead to higher spray drift values.

Although sources of differences between the datasets can be related to e.g. the measuring methodology, wind speed effects during measurements, last nozzle position and field edge effects when spraying a crop, further research work is necessary to clarify the reasons why such big differences between spray drift curves are found under nearly similar conditions and nearly similar trial designs. The expansion of the currently used dataset with spray drift data from other EU Member States is highly recommended to learn more about the real spray drift level (for the central zone e.g. with data from UK, BE).

Samenvatting

Dit rapport beschrijft een eerste poging om twee grote datasets met drift getallen samen te voegen. Beide datasets zijn opgezet om de milieurisico's door spuitdrift bij de toepassing van gewasbeschermingsmiddelen te onderbouwen. Eerst werden de datasets gebruikt voor het genereren van driftcurves voor de nationale beoordeling maar ze kunnen ook gebruikt worden op een Europese schaal. De drift datasets van Nederland en Duitsland zijn samengevoegd om te illustreren wat de mogelijkheden zijn en tegen welke beperkingen men aanloopt en nog opgelost moeten worden, als men op basis van de gezamenlijke data gemeenschappelijke driftcurves wil bepalen.

De spuitdrift data van Duitsland en Nederland zijn gebruikt om drift depositie curves op te stellen voor een gedefinieerde referentie situatie bij de bespuiting van een kale grond of kort gewas (gewashoogte lager dan 20 cm) en een gewas situatie (gewashoogte hoger dan 20 cm). Op basis van ISO22866 en ISO22369-2 is een referentie spuittechniek gedefinieerd als een veldspuit met een spuitboomhoogte op 50 cm boven het gewas of de grond, een spuitdop dicht bij de BCPC Fijn/Midden grensdop en een rijsnelheid van 6-8 km/h. Van de beschikbare Duitse en Nederlandse data zijn alleen die data gebruikt van een veldspuit uitgerust met standaard spleetdoppen (XR11003/XR11004) bij een druk van 3 bar, een spuitboomhoogte van 50 cm boven gewas of grond en een rijsnelheid van 6-8 km/h. De analyse van de samengevoegde data heeft geleid tot een aparte driftcurve voor de kale grond of kort gewas situatie en een gewas situatie. De data voor de gewas situatie is vooral gebaseerd op de Nederlandse dataset.

De in deze rapportage opgestelde drift curves resulteren in een 90-percentiel drift depositie op 5 m afstand van het behandelde oppervlak van 1.0% voor de kale grond situatie en van 2.1% voor de gewas situatie wanneer van een dubbel-exponentiële curvefit procedure gebruik gemaakt wordt. Wordt van een machtsfunctie curvefit gebruik gemaakt dan zijn deze waarden respectievelijk 1.0% en 2.8%. De op dit moment gebruikte Duitse Basic Drift Values, die ook in de EU toelatingsprocedures van gewasbeschermingsmiddelen gebruikt worden, geven op deze afstand een drift depositie van 0,57%.

Hoewel verschillen tussen de datasets terug te voeren zijn naar o.a. de meetmethodologie, de wind snelheid tijdens de drift metingen, de positie van de laatste spuitdop ten opzichte van de rand van het bespoten gewas is er meer onderzoek nodig om de redenen van verschil op te kunnen helderen voor de gevonden grote verschillen tussen de driftcurves onder vrijwel gelijke omstandigheden uitgevoerd en met een bijna vergelijkbare meetopzet. De uitbreiding van de gebruikte dataset met meer drift data van andere EU lidstaten wordt aanbevolen om meer inzicht te krijgen in de voorkomende spuitdrift tijdens de bespuiting van gewasbeschermingsmiddelen (voor de centrale zone bv. met data van UK en BE).

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Appendix I.

Spray drift deposition data for the bare soil surface or short crop situation (DE and NL)

entry	country	Versuchs-Nr.: entry nr orig dbase	year	Versuchs-Datı date	Kulturart: experimen	Kulturart: crop	Entwicklungsstadium: Bestandesh crop height cm	Flüssigkeits spray volur	Hersteller/ machine/ty	boom widt (m)	treated wic (m)	Düsentyp: nzzle type	Fahrgeschwindigl sprayer speed	Gestängehöhe spray boom he	Spritzdruck: spray pressure	repetition	row 1 or 2	Temp. °C Temp.	LFrel. % RH
1	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	1	16	80
2	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	2	16	80
3	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	3	16	80
4	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	4	16	80
5	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	5	16	80
6	DE	214	1991	13-6-1991	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	6	16	80
7	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	1	16	79
8	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	2	16	79
9	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	3	16	79
10	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	4	16	79
11	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	5	16	79
12	DE	213	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	6	16	79
13	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	1	15	81
14	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	2	15	81
15	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	3	15	81
16	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	4	15	81
17	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	5	15	81
18	DE	212	1990	12-9-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	6	15	81
19	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	1	15	81
20	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	2	15	81
21	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	3	15	81
22	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	4	15	81
23	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	5	15	81
24	DE	211	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	1	6	15	81
25	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	1	14	83
26	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	2	14	83
27	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	3	14	83
28	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	4	14	83
29	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	5	14	83
30	DE	210	1990	10-10-1990	Ackerbau	bare	0	300	Hardi 361	*	*	XR 11004	6	50	2.5	2	6	14	83
31	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	1	17.65	57.5
32	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	2	17.65	57.5
33	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	3	17.65	57.5
34	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	4	17.65	57.5
35	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	5	17.65	57.5
36	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	6	17.65	57.5
37	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	7	17.65	57.5
38	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	8	17.65	57.5
39	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	9	17.65	57.5
40	DE	XR04306b	1997	1-4-1997	Fläche	Gras	5	300	Holder ES3	10	20	XR 110 04	6	50	2.5	1	10	17.65	57.5
41	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	1	12.6	96.5
42	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	2	12.6	96.5
43	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	3	12.6	96.5
44	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	4	12.6	96.5
45	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	5	12.6	96.5
46	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	6	12.6	96.5
47	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	7	12.6	96.5

48	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	8	12.6	96.5
49	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	9	12.6	96.5
50	DE	XR04306a	1996	9-10-1996	Fläche	Gras	10	300	Holder ES3	10	20	XR 110 04 VS	6	50	2.6	1	10	12.6	96.5
51	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	1	9.7	97
52	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	2	9.7	97
53	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	3	9.7	97
54	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	4	9.7	97
55	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	5	9.7	97
56	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	6	9.7	97
57	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	7	9.7	97
58	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	8	9.7	97
59	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	9	9.7	97
60	DE	XR03256b	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	1	10	9.7	97
61	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	1	9.3	98
62	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	2	9.3	98
63	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	3	9.3	98
64	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	4	9.3	98
65	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	5	9.3	98
66	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	6	9.3	98
67	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	7	9.3	98
68	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	8	9.3	98
69	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	2	9	9.3	98
70	DE	XR03256a	1996	7-10-1996	Fläche	Gras	10	250	Holder ES3	10	20	XR 110 03	6	50	3.4	3	10	9.3	98
71	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	1	9.15	98
72	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	2	9.15	98
73	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	3	9.15	98
74	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	4	9.15	98
75	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	5	9.15	98
76	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	6	9.15	98
77	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	7	9.15	98
78	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	8	9.15	98
79	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	9	9.15	98
80	DE	XR03206b	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	3	10	9.15	98
81	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	1	9.1	97.6
82	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	2	9.1	97.6
83	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	3	9.1	97.6
84	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	4	9.1	97.6
85	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	5	9.1	97.6
86	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	6	9.1	97.6
87	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	7	9.1	97.6
88	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	8	9.1	97.6
89	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	9	9.1	97.6
90	DE	XR03206a	1996	7-10-1996	Fläche	Gras	10	200	Holder ES3	10	20	XR 110 03	6	50	2.1	4	10	9.1	97.6
91	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	1	23.85	59.75
92	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	2	23.85	59.75
93	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	3	23.85	59.75
94	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	4	23.85	59.75
95	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	5	23.85	59.75
96	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	6	23.85	59.75
97	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	7	23.85	59.75
98	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	1	8	23.85	59.75

99	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	1	9	23.85	59.75
100	DE	S97BBA 15	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	1	10	23.85	59.75
101	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	1	22.05	67.6
102	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	2	22.05	67.6
103	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	3	22.05	67.6
104	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	4	22.05	67.6
105	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	5	22.05	67.6
106	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	6	22.05	67.6
107	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	7	22.05	67.6
108	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	8	22.05	67.6
109	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	9	22.05	67.6
110	DE	S97BBA 14	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	2	10	22.05	67.6
111	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	1	21.15	67.8
112	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	2	21.15	67.8
113	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	3	21.15	67.8
114	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	4	21.15	67.8
115	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	5	21.15	67.8
116	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	6	21.15	67.8
117	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	7	21.15	67.8
118	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	8	21.15	67.8
119	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	9	21.15	67.8
120	DE	S97BBA 13	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	3	10	21.15	67.8
121	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	1	20.05	67.8
122	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	2	20.05	67.8
123	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	3	20.05	67.8
124	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	4	20.05	67.8
125	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	5	20.05	67.8
126	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	6	20.05	67.8
127	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	7	20.05	67.8
128	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	8	20.05	67.8
129	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	9	20.05	67.8
130	DE	S97BBA 12	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	4	10	20.05	67.8
131	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	1	20.15	70.15
132	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	2	20.15	70.15
133	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	3	20.15	70.15
134	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	4	20.15	70.15
135	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	5	20.15	70.15
136	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	6	20.15	70.15
137	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	7	20.15	70.15
138	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	8	20.15	70.15
139	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	9	20.15	70.15
140	DE	S97BBA 11	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	5	10	20.15	70.15
141	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	1	20.1	71.45
142	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	2	20.1	71.45
143	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	3	20.1	71.45
144	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	4	20.1	71.45
145	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	5	20.1	71.45
146	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	6	20.1	71.45
147	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	7	20.1	71.45
148	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	8	20.1	71.45
149	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110	03	XR	6	50	3.5	6	9	20.1	71.45

150	DE	S97BBA 10	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	6	10	20.1	71.45
151	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	1	19.2	71.9
152	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	2	19.2	71.9
153	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	3	19.2	71.9
154	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	4	19.2	71.9
155	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	5	19.2	71.9
156	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	6	19.2	71.9
157	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	7	19.2	71.9
158	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	8	19.2	71.9
159	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	9	19.2	71.9
160	DE	S97BBA 09	1997	8-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	7	10	19.2	71.9
161	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	1	24.5	52.1
162	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	2	24.5	52.1
163	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	3	24.5	52.1
164	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	4	24.5	52.1
165	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	5	24.5	52.1
166	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	6	24.5	52.1
167	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	7	24.5	52.1
168	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	8	24.5	52.1
169	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	9	24.5	52.1
170	DE	S97BBA 07	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	2	10	24.5	52.1
171	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	1	24.4	52
172	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	2	24.4	52
173	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	3	24.4	52
174	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	4	24.4	52
175	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	5	24.4	52
176	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	6	24.4	52
177	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	7	24.4	52
178	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	8	24.4	52
179	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	9	24.4	52
180	DE	S97BBA 06	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	3	10	24.4	52
181	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	1	23.55	54.1
182	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	2	23.55	54.1
183	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	3	23.55	54.1
184	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	4	23.55	54.1
185	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	5	23.55	54.1
186	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	6	23.55	54.1
187	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	7	23.55	54.1
188	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	8	23.55	54.1
189	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	9	23.55	54.1
190	DE	S97BBA05	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	4	10	23.55	54.1
191	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	1	22.8	55.65
192	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	2	22.8	55.65
193	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	3	22.8	55.65
194	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	4	22.8	55.65
195	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	5	22.8	55.65
196	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	6	22.8	55.65
197	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	7	22.8	55.65
198	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	8	22.8	55.65
199	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	9	22.8	55.65
200	DE	S97BBA 02	1997	7-10-1997	Freiland	Brache	8	254	Holder ES3	10	20	110 03 XR	6	50	3.5	5	10	22.8	55.65

201	NL	541	2000	15-06-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	2	1	13.6	71
202	NL	542	2000	15-06-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	2	2	13.6	71
203	NL	543	2000	16-06-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	3	1	15.6	60
204	NL	544	2000	16-06-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	3	2	15.6	60
205	NL	545	2000	17-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	4	1	21.7	*
206	NL	546	2000	17-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	4	2	21.7	*
207	NL	547	2000	17-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	5	1	20.9	*
208	NL	548	2000	17-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	5	2	20.9	*
209	NL	549	2000	30-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	1	17.4	64
210	NL	550	2000	30-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	2	17.4	64
211	NL	551	2000	30-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	1	16.1	72
212	NL	552	2000	30-08-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	2	16.1	72
213	NL	553	2000	05-09-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	1	20.3	91
214	NL	554	2000	05-09-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	2	20.3	91
215	NL	555	2000	05-09-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	9	1	17.8	71
216	NL	556	2000	05-09-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	9	2	17.8	71
217	NL	557	2000	03-10-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	10	1	14.9	*
218	NL	558	2000	03-10-2000	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	10	2	14.9	*
219	NL	969	2001	29-05-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	2	1	*	57
220	NL	970	2001	29-05-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	2	2	*	57
221	NL	973	2001	16-08-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	1	18.9	75
222	NL	974	2001	16-08-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	2	18.9	75
223	NL	979	2001	17-10-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	1	15.7	81
224	NL	980	2001	17-10-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	2	15.7	81
225	NL	981	2001	17-10-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	1	16.1	78
226	NL	982	2001	17-10-2001	ferentiatie	kaal	0	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	2	16.1	78
227	NL	1219	2001	15-10-2001	ferentiatie	maïs	10	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	1	*	73
228	NL	1220	2001	15-10-2001	ferentiatie	maïs	10	300	Hardi Comı	24	24	XR 110.04	6	50	3	6	2	*	73
229	NL	1221	2001	02-11-2001	ferentiatie	maïs	15	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	1	11.5	82
230	NL	1222	2001	02-11-2001	ferentiatie	maïs	15	300	Hardi Comı	24	24	XR 110.04	6	50	3	7	2	11.5	82
231	NL	1223	2001	05-11-2001	ferentiatie	maïs	15	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	1	10.3	67
232	NL	1224	2001	05-11-2001	ferentiatie	maïs	15	300	Hardi Comı	24	24	XR 110.04	6	50	3	8	2	10.3	67
233	NL	2012-1	2012	09-11-2012	velddrift	kaal	0	329	John Deere	27	27	XR 110.04	5.87	50	3.0	1	1	10.0	76
234	NL	2012-2	2012	09-11-2012	velddrift	kaal	0	329	John Deere	27	27	XR 110.04	5.87	50	3.0	1	2	10.0	76
235	NL	2012-3	2012	09-11-2012	velddrift	kaal	0	329	John Deere	27	27	XR 110.04	5.87	50	3.0	2	1	10.1	76
236	NL	2012-4	2012	09-11-2012	velddrift	kaal	0	329	John Deere	27	27	XR 110.04	5.87	50	3.0	2	2	10.1	76
237	NL	2012-5	2012	13-11-2012	velddrift	kaal	0	335	John Deere	27	27	XR 110.04	5.76	50	3.0	3	1	7.5	97
238	NL	2012-6	2012	13-11-2012	velddrift	kaal	0	335	John Deere	27	27	XR 110.04	5.76	50	3.0	3	2	7.5	97
239	NL	2012-7	2012	13-11-2012	velddrift	kaal	0	335	John Deere	27	27	XR 110.04	5.76	50	3.0	4	1	7.6	97
240	NL	2012-8	2012	13-11-2012	velddrift	kaal	0	335	John Deere	27	27	XR 110.04	5.76	50	3.0	4	2	7.6	97
241	NL	2012-9	2012	13-11-2012	velddrift	kaal	0	326	John Deere	27	27	XR 110.04	5.92	50	3.0	5	1	9.0	93
242	NL	2012-10	2012	13-11-2012	velddrift	kaal	0	326	John Deere	27	27	XR 110.04	5.92	50	3.0	5	2	9.0	93
243	NL	2012-11	2012	13-11-2012	velddrift	kaal	0	326	John Deere	27	27	XR 110.04	5.92	50	3.0	6	1	9.0	93
244	NL	2012-12	2012	13-11-2012	velddrift	kaal	0	326	John Deere	27	27	XR 110.04	5.92	50	3.0	6	2	9.0	93
245	NL	2012-13	2012	20-11-2012	velddrift	kaal	0	340	John Deere	27	27	XR 110.04	5.68	50	3.0	7	1	11.5	78
246	NL	2012-14	2012	20-11-2012	velddrift	kaal	0	340	John Deere	27	27	XR 110.04	5.68	50	3.0	7	2	11.5	78
247	NL	2012-15	2012	20-11-2012	velddrift	kaal	0	340	John Deere	27	27	XR 110.04	5.68	50	3.0	8	1	11.6	77
248	NL	2012-16	2012	20-11-2012	velddrift	kaal	0	340	John Deere	27	27	XR 110.04	5.68	50	3.0	8	2	11.6	77

Wind-																distance from 0 point (0.25 m from last nozzl			
richtung	Windgesch	0.25 m	0.5 m	1 m	1.25 m	1.5 m	2.25 m	3.25 m	4.25 m	5.25 m	7.75 m	10.25 m	15.25 m	20.25 m	25.25 m	30.25 m	50.25 m	75.25 m	100.25 m
wind direct	wind speec	0.25	0.5	1	1.25	1.5	2.25	3.25	4.25	5.25	7.75	10.25	15.25	20.25	25.25	30.25	50.25	75.25	100.25
19	1.1	*	*	*	1.04	*	*	0.26	*	0.13	0.09	0.1	0.08	0.15		0	*	*	*
19	1.1	*	*	*	1.43	*	*	0.3	*	0.27	0.19	0.13	0.05	0.01	*	0.01	*	*	*
19	1.1	*	*	*	1.49	*	*	0.49	*	0.22	0.17	0.15	0.05	0.02	*	0	*	*	*
19	1.1	*	*	*	1.66	*	*	0.92	*	0.29	0.18	0.07	0.02	0	*	0	*	*	*
19	1.1	*	*	*	2.31	*	*	0.46	*	0.33	0.15	0.11	0.05	0.01	*	0	*	*	*
19	1.1	*	*	*	2.33	*	*	0.22	*	0.16	0.11	0.07	0.06	0.04	*	0.01	*	*	*
29	1.4	*	*	*	1.1	*	*	0.34	*	0.17	0.04	0.06	0.03	0.01	*	0.01	*	*	*
29	1.4	*	*	*	1.19	*	*	0.36	*	0.21	0.06	0.05	0.02	0	*	0.01	*	*	*
29	1.4	*	*	*	1.55	*	*	0.34	*	0.2	0.11	0.06	0.02	0.01	*	0.01	*	*	*
29	1.4	*	*	*	1.76	*	*	0.6	*	0.39	0.1	0.05	0.02	0.01	*	0.01	*	*	*
29	1.4	*	*	*	2.22	*	*	0.72	*	0.29	0.08	0.06	0.02	0.01	*	0.01	*	*	*
29	1.4	*	*	*	2.35	*	*	0.85	*	0.32	0.09	0.05	0.03	0.01	*	0.01	*	*	*
6	1.7	*	*	*	0.29	*	*	0.19	*	0.12	0.07	0.04	0.04	0.04	*	0.03	*	*	*
6	1.7	*	*	*	0.34	*	*	0.23	*	0.12	0.11	0.15	0.04	0.02	*	0.02	*	*	*
6	1.7	*	*	*	0.37	*	*	0.6	*	0.39	0.13	0.12	0.05	0.03	*	0.02	*	*	*
6	1.7	*	*	*	0.51	*	*	0.46	*	0.3	0.2	0.24	0.09	0.05	*	0.04	*	*	*
6	1.7	*	*	*	0.58	*	*	0.48	*	0.29	0.15	0.15	0.09	0.04	*	0.02	*	*	*
6	1.7	*	*	*	0.6	*	*	0.27	*	0.19	0.09	0.08	0.09	0.05	*	0.02	*	*	*
4	2	*	*	*	0.15	*	*	0.08	*	0.08	0.04	0.04	0.04	0.02	*	0.01	*	*	*
4	2	*	*	*	0.25	*	*	0.13	*	0.07	0.08	0.05	0.04	0.03	*	0.02	*	*	*
4	2	*	*	*	0.26	*	*	0.2	*	0.12	0.06	0.06	0.02	0.02	*	0.02	*	*	*
4	2	*	*	*	0.26	*	*	0.15	*	0.16	0.08	0.05	0.04	0.02	*	0.03	*	*	*
4	2	*	*	*	0.27	*	*	0.26	*	0.26	0.13	0.15	0.07	0.04	*	0.04	*	*	*
4	2	*	*	*	0.37	*	*	0.28	*	0.22	0.22	0.08	0.07	0.04	*	0.04	*	*	*
9	1.9	*	*	*	0.5	*	*	0.37	*	0.27	0.29	0.26	0.15	0.08	*	0.06	*	*	*
9	1.9	*	*	*	0.65	*	*	0.6	*	0.59	0.32	0.23	0.16	0.06	*	0.03	*	*	*
9	1.9	*	*	*	0.67	*	*	0.37	*	0.15	0.11	0.16	0.07	0.02	*	0.01	*	*	*
9	1.9	*	*	*	0.72	*	*	0.32	*	0.27	0.14	0.08	0.05	0.01	*	0.01	*	*	*
9	1.9	*	*	*	1.3	*	*	0.4	*	0.31	0.23	0.27	0.21	0.09	*	0.03	*	*	*
9	1.9	*	*	*	1.31	*	*	0.78	*	0.53	0.18	0.19	0.11	0.12	*	0.01	*	*	*
18	4.3	*	*	*	3.27	*	*	1.42	*	0.54	0.27	0.21	*	0.16	*	0.14	0.10	*	*
18	4.3	*	*	*	4.18	*	*	1.43	*	0.30	0.34	0.16	*	0.09	*	0.06	0.04	*	*
18	4.3	*	*	*	5.98	*	*	1.07	*	0.32	1.09	0.25	*	0.08	*	0.14	0.05	*	*
18	4.3	*	*	*	2.22	*	*	0.54	*	0.39	1.03	0.21	*	0.09	*	0.11	0.05	*	*
18	4.3	*	*	*	1.66	*	*	0.47	*	0.82	0.52	0.21	*	0.11	*	0.09	0.04	*	*
18	4.3				1.76			0.45		0.87	0.52	0.69		0.15		0.10	0.03		
18	4.3				2.34			0.42		0.55	0.42	0.34		0.11		0.05	0.03		
18	4.3				1.83			0.52		0.39	0.47	0.23		0.12		0.06	0.03		
18	4.3				2.04			0.61		0.46	0.26	0.16		0.16		0.07	0.02		
18	4.3				1.05			0.81		0.85	0.44	0.14		0.09		0.06	0.03		
28.5	2.8	*	*	*	0.90	*	*	0.56	*	0.22	0.16	0.16	*	0.05	*	0.04	0.06	*	*
28.5	2.8	*	*	*	0.90	*	*	0.32	*	0.40	0.13	0.13	*	0.03	*	0.08	0.04	*	*
28.5	2.8	*	*	*	0.63	*	*	0.26	*	0.41	0.25	0.12	*	0.03	*	0.02	0.03	*	*
28.5	2.8	*	*	*	0.94	*	*	0.26	*	0.22	0.26	0.17	*	0.04	*	0.02	0.02	*	*
28.5	2.8	*	*	*	0.61	*	*	0.36	*	0.24	0.24	0.21	*	0.03	*	0.02	0.02	*	*
28.5	2.8	*	*	*	0.73	*	*	0.30	*	0.21	0.18	0.16	*	0.04	*	0.03	0.02	*	*
28.5	2.8	*	*	*	0.70	*	*	0.27	*	0.20	0.17	0.15	*	0.05	*	0.03	0.02	*	*

28.5	2.8	*	*	*	1.04	*	*	0.18	*	0.17	0.13	0.17	*	0.06	*	0.02	0.02	*	*
28.5	2.8	*	*	*	0.71	*	*	0.25	*	0.18	0.11	0.08	*	0.06	*	0.03	0.05	*	*
28.5	2.8	*	*	*	0.65	*	*	0.22	*	0.16	0.14	0.08	*	0.08	*	0.06	0.06	*	*
12	2.8	*	*	*	1.38	*	*	0.59	*	0.38	0.31	0.19	*	0.07	*	0.08	0.05	*	*
12	2.8	*	*	*	0.98	*	*	0.42	*	0.25	0.14	0.16	*	0.08	*	0.06	0.04	*	*
12	2.8	*	*	*	0.96	*	*	0.40	*	0.21	0.13	0.10	*	0.06	*	0.05	0.09	*	*
12	2.8	*	*	*	1.09	*	*	0.37	*	0.17	0.14	0.11	*	0.06	*	0.05	0.04	*	*
12	2.8	*	*	*	1.06	*	*	0.28	*	0.26	0.17	0.09	*	0.06	*	0.05	0.04	*	*
12	2.8	*	*	*	0.50	*	*	0.30	*	0.24	0.17	0.10	*	0.07	*	0.04	0.04	*	*
12	2.8	*	*	*	0.63	*	*	0.27	*	0.20	0.17	0.10	*	0.04	*	0.05	0.04	*	*
12	2.8	*	*	*	0.65	*	*	0.34	*	0.22	0.19	0.10	*	0.05	*	0.06	0.04	*	*
12	2.8	*	*	*	1.58	*	*	0.58	*	0.34	0.17	0.10	*	0.05	*	0.05	0.03	*	*
12	2.8	*	*	*	1.49	*	*	0.80	*	0.35	0.19	0.16	*	0.08	*	0.04	0.04	*	*
7	2.4	*	*	*	1.70	*	*	0.67	*	0.47	0.39	0.29	*	0.12	*	0.08	0.06	*	*
7	2.4	*	*	*	2.24	*	*	0.90	*	0.65	0.40	0.37	*	0.11	*	0.06	0.05	*	*
7	2.4	*	*	*	1.90	*	*	0.86	*	0.85	0.48	0.37	*	0.12	*	0.05	0.05	*	*
7	2.4	*	*	*	2.01	*	*	0.59	*	0.52	0.37	0.27	*	0.13	*	0.06	0.05	*	*
7	2.4	*	*	*	2.10	*	*	0.57	*	0.42	0.31	0.19	*	0.13	*	0.06	0.05	*	*
7	2.4	*	*	*	2.68	*	*	0.67	*	0.56	0.28	0.19	*	0.11	*	0.08	0.05	*	*
7	2.4	*	*	*	1.72	*	*	0.75	*	0.44	0.41	0.24	*	0.13	*	0.07	0.05	*	*
7	2.4	*	*	*	2.13	*	*	0.82	*	0.69	0.47	0.33	*	0.12	*	0.09	0.05	*	*
7	2.4	*	*	*	1.32	*	*	0.73	*	0.55	0.29	0.18	*	0.13	*	0.07	0.05	*	*
7	2.4	*	*	*	3.33	*	*	0.86	*	0.49	0.27	0.23	*	0.26	*	0.07	0.06	*	*
9.5	2.45	*	*	*	2.12	*	*	0.98	*	0.48	0.34	0.26	*	0.16	*	0.10	0.08	*	*
9.5	2.45	*	*	*	2.31	*	*	1.15	*	0.80	0.25	0.24	*	0.13	*	0.12	0.07	*	*
9.5	2.45	*	*	*	1.87	*	*	1.10	*	0.78	0.39	0.30	*	0.12	*	0.09	0.07	*	*
9.5	2.45	*	*	*	2.24	*	*	0.53	*	0.57	0.47	0.38	*	0.10	*	0.09	0.06	*	*
9.5	2.45	*	*	*	1.87	*	*	0.96	*	0.78	0.51	0.36	*	0.12	*	0.07	0.07	*	*
9.5	2.45	*	*	*	2.08	*	*	1.19	*	1.02	0.56	0.41	*	0.15	*	0.15	0.07	*	*
9.5	2.45	*	*	*	3.66	*	*	1.40	*	0.76	0.52	0.39	*	0.14	*	0.08	0.08	*	*
9.5	2.45	*	*	*	2.81	*	*	0.85	*	0.61	0.35	0.40	*	0.14	*	0.08	0.08	*	*
9.5	2.45	*	*	*	2.24	*	*	0.95	*	0.72	0.42	0.24	*	0.19	*	0.08	0.07	*	*
9.5	2.45	*	*	*	2.19	*	*	1.01	*	0.63	0.33	0.40	*	0.19	*	0.12	0.08	*	*
6.5	2.7	*	*	*	1.63	*	*	0.59	*	0.51	0.31	0.24	*	0.11	*	0.10	0.10	*	*
6.5	2.7	*	*	*	2.07	*	*	0.99	*	0.61	0.46	0.40	*	0.09	*	0.08	0.07	*	*
6.5	2.7	*	*	*	2.39	*	*	0.97	*	0.68	0.45	0.37	*	0.11	*	0.12	0.07	*	*
6.5	2.7	*	*	*	1.31	*	*	0.82	*	0.49	0.45	0.33	*	0.15	*	0.07	0.06	*	*
6.5	2.7	*	*	*	2.20	*	*	0.94	*	0.56	0.33	0.24	*	0.11	*	0.07	0.06	*	*
6.5	2.7	*	*	*	1.55	*	*	0.42	*	0.53	0.25	0.20	*	0.11	*	0.07	0.06	*	*
6.5	2.7	*	*	*	1.54	*	*	0.45	*	0.34	0.17	0.17	*	0.16	*	0.07	0.07	*	*
6.5	2.7	*	*	*	1.81	*	*	0.47	*	0.32	0.28	0.25	*	0.12	*	0.26	0.18	*	*
6.5	2.7	*	*	*	3.21	*	*	0.80	*	0.36	0.24	0.17	*	0.11	*	0.08	0.10	*	*
6.5	2.7	*	*	*	2.65	*	*	1.02	*	0.70	0.29	0.22	*	0.16	*	0.11	0.09	*	*
15	3.65	16.70	*	*	*	*	*	*	*	0.29	*	0.08	*	0.022	*	0.020	0.016	0.010	0.017
15	3.65	19.62	*	*	*	*	*	*	*	0.27	*	0.08	*	0.040	*	0.015	0.015	0.009	0.011
15	3.65	19.49	*	*	*	*	*	*	*	0.34	*	0.07	*	0.025	*	0.015	0.054	0.007	0.012
15	3.65	18.26	*	*	*	*	*	*	*	0.34	*	0.08	*	0.029	*	0.015	0.029	0.012	0.008
15	3.65	22.34	*	*	*	*	*	*	*	0.29	*	0.08	*	0.027	*	0.059	0.014	0.014	0.008
15	3.65	20.20	*	*	*	*	*	*	*	0.25	*	0.10	*	0.027	*	0.018	0.012	0.015	0.010
15	3.65	18.32	*	*	*	*	*	*	*	0.23	*	0.15	*	0.032	*	0.013	0.013	0.010	0.011
15	3.65	20.39	*	*	*	*	*	*	*	0.26	*	0.12	*	0.026	*	0.015	0.013	0.009	0.009

15	3.65	20.33	*	*	*	*	*	*	*	0.27	*	0.14	*	0.035	*	0.020	0.016	0.015	0.008
15	3.65	19.16	*	*	*	*	*	*	*	0.43	*	0.15	*	0.030	*	0.029	0.015	0.028	0.011
23	3.45	16.05	*	*	*	*	*	*	*	0.23	*	0.14	*	0.079	*	0.041	0.023	0.033	0.014
23	3.45	15.04	*	*	*	*	*	*	*	0.49	*	0.12	*	0.053	*	0.022	0.023	0.011	0.010
23	3.45	16.49	*	*	*	*	*	*	*	0.40	*	0.13	*	0.110	*	0.022	0.027	0.032	0.013
23	3.45	15.04	*	*	*	*	*	*	*	0.30	*	0.07	*	0.045	*	0.020	0.032	0.020	0.017
23	3.45	19.84	*	*	*	*	*	*	*	0.22	*	0.07	*	0.048	*	0.027	0.023	0.017	0.031
23	3.45	21.03	*	*	*	*	*	*	*	0.18	*	0.06	*	0.052	*	0.038	0.028	0.011	0.041
23	3.45	18.89	*	*	*	*	*	*	*	0.21	*	0.08	*	0.071	*	0.049	0.043	0.017	0.057
23	3.45	20.34	*	*	*	*	*	*	*	0.20	*	0.13	*	0.049	*	0.030	0.022	0.014	0.041
23	3.45	20.53	*	*	*	*	*	*	*	0.32	*	0.26	*	0.057	*	0.026	0.036	0.013	0.011
23	3.45	17.56	*	*	*	*	*	*	*	0.57	*	0.27	*	0.066	*	0.039	0.072	0.053	0.025
5.5	3.6	13.69	*	*	*	*	*	*	*	0.31	*	0.06	*	0.018	*	0.034	0.037	0.029	0.011
5.5	3.6	16.44	*	*	*	*	*	*	*	0.31	*	0.05	*	0.007	*	0.019	0.020	0.010	0.007
5.5	3.6	10.29	*	*	*	*	*	*	*	0.31	*	0.06	*	0.014	*	0.022	0.017	0.009	0.008
5.5	3.6	15.13	*	*	*	*	*	*	*	0.29	*	0.05	*	0.017	*	0.021	0.016	0.010	0.007
5.5	3.6	14.28	*	*	*	*	*	*	*	0.30	*	0.07	*	0.021	*	0.022	0.016	0.007	0.010
5.5	3.6	13.23	*	*	*	*	*	*	*	0.29	*	0.07	*	0.020	*	0.026	0.019	0.008	0.009
5.5	3.6	16.18	*	*	*	*	*	*	*	0.32	*	0.08	*	0.027	*	0.033	0.018	0.013	0.007
5.5	3.6	13.69	*	*	*	*	*	*	*	0.35	*	0.13	*	0.024	*	0.024	0.029	0.025	0.007
5.5	3.6	12.32	*	*	*	*	*	*	*	0.30	*	0.08	*	0.015	*	0.022	0.018	0.007	0.009
5.5	3.6	10.16	*	*	*	*	*	*	*	0.35	*	0.10	*	0.009	*	0.027	0.017	0.022	0.008
10.5	3.9	16.35	*	*	*	*	*	*	*	0.70	*	0.35	*	0.248	*	0.118	0.041	0.030	0.031
10.5	3.9	18.24	*	*	*	*	*	*	*	0.63	*	0.38	*	0.266	*	0.085	0.025	0.032	0.035
10.5	3.9	17.74	*	*	*	*	*	*	*	0.71	*	0.34	*	0.309	*	0.118	0.026	0.059	0.029
10.5	3.9	11.76	*	*	*	*	*	*	*	0.73	*	0.38	*	0.260	*	0.134	0.033	0.025	0.025
10.5	3.9	18.24	*	*	*	*	*	*	*	0.66	*	0.31	*	0.289	*	0.116	0.028	0.054	0.039
10.5	3.9	21.32	*	*	*	*	*	*	*	0.78	*	0.27	*	0.262	*	0.125	0.031	0.083	0.029
10.5	3.9	21.01	*	*	*	*	*	*	*	0.69	*	0.28	*	0.288	*	0.083	0.031	0.026	0.031
10.5	3.9	18.11	*	*	*	*	*	*	*	0.69	*	0.32	*	0.275	*	0.071	0.027	0.038	0.029
10.5	3.9	21.32	*	*	*	*	*	*	*	0.78	*	0.32	*	0.217	*	0.060	0.035	0.025	0.017
10.5	3.9	20.88	*	*	*	*	*	*	*	0.78	*	0.34	*	0.228	*	0.066	0.035	0.040	0.018
12.5	3.85	15.56	*	*	*	*	*	*	*	0.28	*	0.27	*	0.213	*	0.069	0.038	0.025	0.023
12.5	3.85	14.21	*	*	*	*	*	*	*	0.32	*	0.33	*	0.218	*	0.077	0.028	0.019	0.020
12.5	3.85	17.95	*	*	*	*	*	*	*	0.30	*	0.31	*	0.244	*	0.069	0.028	0.032	0.019
12.5	3.85	13.90	*	*	*	*	*	*	*	0.36	*	0.31	*	0.243	*	0.067	0.034	0.023	0.018
12.5	3.85	9.67	*	*	*	*	*	*	*	0.46	*	0.30	*	0.247	*	0.073	0.029	0.028	0.021
12.5	3.85	14.76	*	*	*	*	*	*	*	0.47	*	0.25	*	0.241	*	0.104	0.024	0.023	0.021
12.5	3.85	8.94	*	*	*	*	*	*	*	0.40	*	0.40	*	0.260	*	0.065	0.030	0.020	0.020
12.5	3.85	12.37	*	*	*	*	*	*	*	0.30	*	0.38	*	0.210	*	0.071	0.023	0.022	0.022
12.5	3.85	9.73	*	*	*	*	*	*	*	0.30	*	0.38	*	0.212	*	0.072	0.030	0.018	0.021
12.5	3.85	13.41	*	*	*	*	*	*	*	0.31	*	0.33	*	0.238	*	0.080	0.031	0.027	0.038
28.5	2.8	11.62	*	*	*	*	*	*	*	0.53	*	0.39	*	0.081	*	0.054	0.022	0.005	0.020
28.5	2.8	16.25	*	*	*	*	*	*	*	0.52	*	0.33	*	0.074	*	0.073	0.005	0.001	0.021
28.5	2.8	22.97	*	*	*	*	*	*	*	0.49	*	0.31	*	0.085	*	0.065	0.005	0.003	0.008
28.5	2.8	15.38	*	*	*	*	*	*	*	0.50	*	0.29	*	0.166	*	0.072	0.008	0.004	0.006
28.5	2.8	10.55	*	*	*	*	*	*	*	0.33	*	0.29	*	0.123	*	0.067	0.045	0.009	0.010
28.5	2.8	12.16								0.38		0.30		0.123		0.052	0.043	0.018	0.011
28.5	2.8	12.29								0.61		0.38		0.152		0.043	0.004	0.010	0.013
28.5	2.8	10.88								0.72		0.36		0.162		0.042	0.003	0.006	0.014
28.5	2.8	18.74								0.70		0.29		0.117		0.079	0.004	0.004	0.025

28.5	2.8	21.29								0.84		0.29		0.118		0.054	0.008	0.010	0.006
26.5	2.9	15.22	*	*	*	*	*	*	*	0.23	*	0.18	*	0.052	*	0.064	0.037	0.022	0.029
26.5	2.9	29.70	*	*	*	*	*	*	*	0.34	*	0.20	*	0.037	*	0.050	0.031	0.026	0.032
26.5	2.9	19.89	*	*	*	*	*	*	*	0.31	*	0.14	*	0.059	*	0.043	0.056	0.014	0.034
26.5	2.9	19.96	*	*	*	*	*	*	*	0.22	*	0.09	*	0.060	*	0.069	0.038	0.064	0.018
26.5	2.9	11.28	*	*	*	*	*	*	*	0.25	*	0.08	*	0.073	*	0.045	0.025	0.021	0.015
26.5	2.9	17.95	*	*	*	*	*	*	*	0.30	*	0.10	*	0.064	*	0.041	0.027	0.018	0.019
26.5	2.9	21.03	*	*	*	*	*	*	*	0.24	*	0.10	*	0.056	*	0.046	0.035	0.033	0.018
26.5	2.9	11.48	*	*	*	*	*	*	*	0.21	*	0.12	*	0.073	*	0.047	0.068	0.030	0.015
26.5	2.9	16.82	*	*	*	*	*	*	*	0.27	*	0.20	*	0.089	*	0.046	0.026	0.024	0.029
26.5	2.9	16.22	*	*	*	*	*	*	*	0.43	*	0.19	*	0.088	*	0.048	0.037	0.050	0.019
12.0	3.5	12.17	*	*	*	*	*	*	*	0.11	*	0.05	*	0.024	*	0.008	0.011	0.013	0.012
12.0	3.5	9.66	*	*	*	*	*	*	*	0.09	*	0.04	*	0.017	*	0.010	0.006	0.006	0.006
12.0	3.5	10.39	*	*	*	*	*	*	*	0.09	*	0.03	*	0.016	*	0.004	0.007	0.007	0.005
12.0	3.5	13.00	*	*	*	*	*	*	*	0.13	*	0.02	*	0.014	*	0.008	0.009	0.017	0.007
12.0	3.5	13.22	*	*	*	*	*	*	*	0.04	*	0.02	*	0.014	*	0.008	0.008	0.003	0.004
12.0	3.5	9.05	*	*	*	*	*	*	*	0.04	*	0.03	*	0.013	*	0.008	0.009	0.008	0.004
12.0	3.5	12.02	*	*	*	*	*	*	*	0.04	*	0.04	*	0.016	*	0.006	0.010	0.006	0.004
12.0	3.5	13.43	*	*	*	*	*	*	*	0.05	*	0.05	*	0.017	*	0.007	0.010	0.006	0.004
12.0	3.5	16.01	*	*	*	*	*	*	*	0.10	*	0.07	*	0.023	*	0.013	0.011	0.009	0.006
12.0	3.5	16.30	*	*	*	*	*	*	*	0.06	*	0.09	*	0.026	*	0.015	0.013	0.004	0.004
22.5	2.95	16.66	*	*	*	*	*	*	*	0.15	*	0.03	*	0.024	*	0.021	0.014	0.011	0.014
22.5	2.95	16.40	*	*	*	*	*	*	*	0.16	*	0.06	*	0.021	*	0.011	0.010	0.009	0.010
22.5	2.95	15.29	*	*	*	*	*	*	*	0.18	*	0.06	*	0.020	*	0.010	0.009	0.009	0.013
22.5	2.95	16.33	*	*	*	*	*	*	*	0.15	*	0.09	*	0.016	*	0.012	0.009	0.005	0.011
22.5	2.95	10.69	*	*	*	*	*	*	*	0.16	*	0.05	*	0.022	*	0.008	0.010	0.006	0.007
22.5	2.95	12.99	*	*	*	*	*	*	*	0.14	*	0.05	*	0.016	*	0.007	0.009	0.014	0.007
22.5	2.95	17.00	*	*	*	*	*	*	*	0.17	*	0.04	*	0.020	*	0.009	0.010	0.006	0.015
22.5	2.95	18.96	*	*	*	*	*	*	*	0.14	*	0.06	*	0.021	*	0.007	0.015	0.007	0.010
22.5	2.95	16.88	*	*	*	*	*	*	*	0.18	*	0.05	*	0.018	*	0.010	0.018	0.019	0.007
22.5	2.95	20.15	*	*	*	*	*	*	*	0.15	*	0.06	*	0.020	*	0.012	0.015	0.014	0.009
21	4.3	11.98	*	*	*	*	*	*	*	0.25	*	0.06	*	0.021	*	0.032	0.013	0.011	0.014
21	4.3	11.64	*	*	*	*	*	*	*	0.23	*	0.08	*	0.018	*	0.018	0.009	0.010	0.006
21	4.3	13.03	*	*	*	*	*	*	*	0.25	*	0.08	*	0.013	*	0.015	0.010	0.005	0.014
21	4.3	8.60	*	*	*	*	*	*	*	0.25	*	0.06	*	0.019	*	0.019	0.010	0.006	0.006
21	4.3	10.97	*	*	*	*	*	*	*	0.27	*	0.07	*	0.025	*	0.025	0.009	0.007	0.007
21	4.3	14.31	*	*	*	*	*	*	*	0.17	*	0.09	*	0.036	*	0.014	0.011	0.004	0.009
21	4.3	13.56	*	*	*	*	*	*	*	0.23	*	0.10	*	0.039	*	0.021	0.014	0.005	0.013
21	4.3	20.88	*	*	*	*	*	*	*	0.22	*	0.10	*	0.029	*	0.013	0.007	0.005	0.013
21	4.3	18.85	*	*	*	*	*	*	*	0.26	*	0.10	*	0.030	*	0.023	0.008	0.015	0.012
21	4.3	22.65	*	*	*	*	*	*	*	0.32	*	0.11	*	0.034	*	0.021	0.011	0.014	0.007
22	4.1	12.49								0.09		0.02		0.011		0.006	0.011	0.010	0.010
22	4.1	8.31								0.05		0.03		0.010		0.002	0.013	0.005	0.009
22	4.1	20.22								0.13		0.02		0.016		0.003	0.010	0.006	0.009
22	4.1	9.99								0.18		0.03		0.019		0.003	0.011	0.007	0.008
22	4.1	6.12								0.12		0.04		0.022		0.005	0.014	0.005	0.006
22	4.1	9.77	*	*	*	*	*	*	*	0.10	*	0.04	*	0.053	*	0.007	0.005	0.010	0.006
22	4.1	12.17	*	*	*	*	*	*	*	0.12	*	0.03	*	0.017	*	0.003	0.011	0.009	0.007
22	4.1	15.60	*	*	*	*	*	*	*	0.09	*	0.05	*	0.016	*	0.027	0.025	0.010	0.005
22	4.1	14.67	*	*	*	*	*	*	*	0.09	*	0.04	*	0.017	*	0.004	0.012	0.005	0.005
22	4.1	13.39	*	*	*	*	*	*	*	0.09	*	0.04	*	0.033	*	0.012	0.012	0.009	0.005

5	3.5	*	30.45	12.89	*	5.31	2.62	1.42	1.09	0.98	0.49	0.24	0.23	*	*	*	*	*	*
5	3.5	*	27.82	7.40	*	3.63	1.80	1.11	1.23	0.96	0.56	0.40	0.24	*	*	*	*	*	*
-3	3.4	*	17.31	6.11	*	0.85	0.55	0.50	0.53	0.50	0.23	0.23	0.15	*	*	*	*	*	*
-3	3.4	*	18.58	5.11	*	2.18	0.80	0.33	0.27	0.33	0.33	0.23	0.23	*	*	*	*	*	*
-20	3.6	*	24.06	13.09	*	6.41	2.70	1.14	0.38	0.09	0.02	0.02	0.03	*	*	*	*	*	*
-20	3.6	*	28.16	17.86	*	16.43	8.62	2.93	0.74	0.41	0.06	0.01	0.01	*	*	*	*	*	*
-30	3.5	*	17.04	6.45	*	6.42	4.29	2.17	1.06	0.51	0.15	0.07	0.04	*	*	*	*	*	*
-30	3.5	*	10.28	6.72	*	5.60	4.33	2.98	1.28	0.87	0.35	0.10	0.02	*	*	*	*	*	*
23	2.8	*	24.80	6.41	*	4.94	2.74	1.82	1.34	1.31	0.36	0.23	0.14	*	*	*	*	*	*
23	2.8	*	25.40	8.43	*	5.72	3.12	2.08	1.38	0.88	1.09	0.63	0.11	*	*	*	*	*	*
28	1.8	*	13.92	5.65	*	3.35	2.41	1.87	1.15	0.65	0.35	0.17	0.11	*	*	*	*	*	*
28	1.8	*	8.37	4.52	*	3.32	2.23	1.58	0.85	0.85	0.30	0.23	0.13	*	*	*	*	*	*
6	2.1	*	4.32	2.24	*	1.44	0.71	0.44	0.30	0.21	0.16	0.09	0.04	*	*	*	*	*	*
6	2.1	*	4.97	2.12	*	1.45	1.24	0.72	0.35	0.26	0.16	0.11	0.16	*	*	*	*	*	*
21	2.1	*	25.42	10.44	*	6.48	5.56	3.37	1.54	0.84	0.46	0.15	0.20	*	*	*	*	*	*
21	2.1	*	24.05	10.04	*	7.28	5.16	3.66	2.16	0.50	0.15	0.15	0.07	*	*	*	*	*	*
-29	3.3	*	23.89	7.67	*	5.80	4.34	2.86	1.68	1.21	0.56	0.34	0.18	*	*	*	*	*	*
-29	3.3	*	37.79	3.78	*	11.11	3.64	4.37	2.93	1.91	1.78	0.89	0.83	*	*	*	*	*	*
11	3.7	*	11.09	7.55	*	5.17	3.32	2.59	1.78	1.34	0.67	0.38	0.17	*	*	*	*	*	*
11	3.7	*	13.30	5.30	*	3.55	1.80	1.30	0.95	0.56	0.44	0.36	0.23	*	*	*	*	*	*
-19	2.9	*	24.54	5.83	*	2.80	1.20	0.83	0.90	0.53	0.28	0.17	0.09	*	*	*	*	*	*
-19	2.9	*	10.13	2.57	*	1.32	0.94	1.13	0.67	0.48	0.47	0.31	0.16	*	*	*	*	*	*
8	4.4	*	37.31	18.59	*	9.10	7.30	5.40	4.51	2.86	2.09	1.95	1.51	*	*	*	*	*	*
8	4.4	*	52.60	19.16	*	14.41	7.58	6.29	4.32	4.05	2.68	1.57	0.63	*	*	*	*	*	*
11	4.9	*	14.17	1.51	*	0.99	0.55	0.50	0.41	0.49	0.27	0.24	0.11	*	*	*	*	*	*
11	4.9	*	14.93	4.28	*	1.71	0.71	0.40	0.28	0.35	0.29	0.28	0.11	*	*	*	*	*	*
*	*	*	20.68	12.64	*	9.29	4.70	2.86	2.15	1.55	1.89	1.11	0.50	*	*	*	*	*	*
*	*	*	27.03	21.89	*	9.50	4.45	3.19	2.28	2.06	1.45	1.22	0.97	*	*	*	*	*	*
27	0.9	*	44.03	21.71	*	13.10	6.65	4.38	1.65	1.14	0.23	0.13	0.09	*	*	*	*	*	*
27	0.9	*	23.60	20.45	*	4.84	2.59	2.47	1.70	2.07	1.23	0.17	0.08	*	*	*	*	*	*
27	2.8	*	21.58	2.36	*	0.42	0.14	0.14	0.14	0.17	0.17	0.06	0.05	*	*	*	*	*	*
27	2.8	*	25.03	3.54	*	0.50	0.29	0.24	0.28	0.13	0.25	0.07	0.03	*	*	*	*	*	*
8	3.42	*	17.12	7.97	*	3.40	1.03	0.38	0.33	0.31	0.15	0.09	0.05	0.03	0.02	*	*	*	*
8	3.42	*	12.10	3.08	*	1.85	0.88	0.46	0.26	0.18	0.14	0.09	0.03	0.05	0.03	*	*	*	*
12	3.41	*	1.92	0.79	*	0.57	0.48	0.46	0.26	0.20	0.07	0.04	0.05	0.04	0.02	*	*	*	*
12	3.41	*	0.89	0.49	*	0.31	0.42	0.37	0.21	0.20	0.17	0.05	0.03	0.02	0.03	*	*	*	*
22	2.03	*	17.58	6.12	*	0.89	0.74	0.27	0.28	0.18	0.25	0.13	0.07	0.09	0.04	*	*	*	*
22	2.03	*	11.01	2.08	*	0.46	0.62	0.42	0.48	0.18	0.15	0.17	0.07	0.07	0.06	*	*	*	*
21	1.79	*	4.70	0.61	*	0.35	0.39	0.33	0.27	0.21	0.18	0.14	0.08	0.06	0.04	*	*	*	*
21	1.79	*	4.81	0.59	*	0.71	0.52	0.51	0.31	0.23	0.15	0.15	0.07	0.07	0.06	*	*	*	*
9	2.06	*	23.71	7.91	*	3.96	1.33	0.65	0.71	0.62	0.35	0.19	0.11	0.07	0.06	*	*	*	*
9	2.06	*	20.04	7.20	*	2.68	0.74	0.26	0.33	0.43	0.19	0.15	0.17	0.08	0.06	*	*	*	*
12	1.92	*	17.08	4.13	*	2.81	1.31	0.38	0.20	0.19	0.12	0.04	0.05	0.05	0.03	*	*	*	*
12	1.92	*	14.16	3.35	*	0.75	0.55	0.39	0.24	0.23	0.09	0.09	0.02	0.02	0.03	*	*	*	*
22	3.42	*	25.53	13.69	*	6.22	3.69	1.67	0.78	0.50	0.45	0.20	0.15	0.12	0.09	*	*	*	*
22	3.42	*	18.69	11.35	*	5.14	3.84	1.66	0.92	0.56	0.39	0.37	0.21	0.17	0.10	*	*	*	*
22	3.02	*	17.42	10.79	*	4.41	2.99	1.48	1.09	0.63	0.43	0.38	0.26	0.18	0.20	*	*	*	*
22	3.02	*	17.67	7.10	*	5.03	2.61	1.32	1.15	0.97	0.80	0.50	0.25	0.19	0.12	*	*	*	*

Appendix II.

Spray drift deposition data for the crop situation (DE and NL)

entry	country	Versuchs-Nr.: entry nr orig dbase	year	Kulturart: experiment/	Kulturart: crop	Versuchs-D date	repetition	code	row 1 or 2	tijd	locatie	grond/	machine/type		boom width (m)	nzzle type	treated width (m)	spray pressure	sprayer spe	spray volume	crop height	developme	boom height [cm]
1	DE	222	1990	Ackerbau	crop	26-4-1990	3		1				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
2	DE	222	1990	Ackerbau	crop	26-4-1990	3		2				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
3	DE	222	1990	Ackerbau	crop	26-4-1990	3		3				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
4	DE	222	1990	Ackerbau	crop	26-4-1990	3		4				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
5	DE	222	1990	Ackerbau	crop	26-4-1990	3		5				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
6	DE	222	1990	Ackerbau	crop	26-4-1990	3		6				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
7	DE	223	1990	Ackerbau	crop	26-4-1990	4		1				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
8	DE	223	1990	Ackerbau	crop	26-4-1990	4		2				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
9	DE	223	1990	Ackerbau	crop	26-4-1990	4		3				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
10	DE	223	1990	Ackerbau	crop	26-4-1990	4		4				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
11	DE	223	1990	Ackerbau	crop	26-4-1990	4		5				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
12	DE	223	1990	Ackerbau	crop	26-4-1990	4		6				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
13	DE	224	1990	Ackerbau	crop	18-6-1990	1		1				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
14	DE	224	1990	Ackerbau	crop	18-6-1990	1		2				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
15	DE	224	1990	Ackerbau	crop	18-6-1990	1		3				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
16	DE	224	1990	Ackerbau	crop	18-6-1990	1		4				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
17	DE	224	1990	Ackerbau	crop	18-6-1990	1		5				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
18	DE	224	1990	Ackerbau	crop	18-6-1990	1		6				Hardi 361			XR 11004	20	2.5	6	300		42/45	50
19	NL	115	1999	vergelijking	aardappel	06-07-1999	6	III,-	1	19:30	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
20	NL	116	1999	vergelijking	aardappel	06-07-1999	6	III,-	2	19:30	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
21	NL	117	1999	vergelijking	aardappel	07-07-1999	7	III,-	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
22	NL	118	1999	vergelijking	aardappel	07-07-1999	7	III,-	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
23	NL	119	1999	vergelijking	aardappel	07-07-1999	8	III,-	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
24	NL	120	1999	vergelijking	aardappel	07-07-1999	8	III,-	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	55	B	50
25	NL	121	1999	vergelijking	aardappel	24-08-1999	3	III,-	1	16:15	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
26	NL	122	1999	vergelijking	aardappel	24-08-1999	3	III,-	2	16:15	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
27	NL	123	1999	vergelijking	aardappel	24-08-1999	4	III,-	1	13:38	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
28	NL	124	1999	vergelijking	aardappel	24-08-1999	4	III,-	2	13:38	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
29	NL	125	1999	vergelijking	aardappel	24-08-1999	9	III,-	1	19:34	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
30	NL	126	1999	vergelijking	aardappel	24-08-1999	9	III,-	2	19:34	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	60	C	50
31	NL	127	1999	vergelijking	aardappel	03-09-1999	10	III,-	1	14:05	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
32	NL	128	1999	vergelijking	aardappel	03-09-1999	10	III,-	2	14:05	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
33	NL	129	1999	vergelijking	aardappel	03-09-1999	11	III,-	1	14:49	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
34	NL	130	1999	vergelijking	aardappel	03-09-1999	11	III,-	2	14:49	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
35	NL	131	1999	vergelijking	aardappel	03-09-1999	12	III,-	1	16:14	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
36	NL	132	1999	vergelijking	aardappel	03-09-1999	12	III,-	2	16:14	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.1	312 w+0,1%Agral	65	C	50
37	NL	197	1999	puitboomhoogte	aardappel	24-09-1999	2	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	40	C	50
38	NL	198	1999	puitboomhoogte	aardappel	24-09-1999	2	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	40	C	50
39	NL	199	1999	puitboomhoogte	suikerbiet	07-10-1999	3	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
40	NL	200	1999	puitboomhoogte	suikerbiet	07-10-1999	3	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
41	NL	201	1999	puitboomhoogte	suikerbiet	07-10-1999	4	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
42	NL	202	1999	puitboomhoogte	suikerbiet	07-10-1999	4	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
43	NL	203	1999	puitboomhoogte	suikerbiet	07-10-1999	5	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
44	NL	204	1999	puitboomhoogte	suikerbiet	07-10-1999	5	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
45	NL	205	1999	puitboomhoogte	suikerbiet	07-10-1999	6	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
46	NL	206	1999	puitboomhoogte	suikerbiet	07-10-1999	6	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	50	B	50
47	NL	207	1999	puitboomhoogte	mosterd	11-10-1999	7	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
48	NL	208	1999	puitboomhoogte	mosterd	11-10-1999	7	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
49	NL	209	1999	puitboomhoogte	mosterd	11-10-1999	8	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
50	NL	210	1999	puitboomhoogte	mosterd	11-10-1999	8	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
51	NL	211	1999	puitboomhoogte	mosterd	12-10-1999	9	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
52	NL	212	1999	puitboomhoogte	mosterd	12-10-1999	9	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
53	NL	213	1999	puitboomhoogte	mosterd	12-10-1999	10	St	1	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
54	NL	214	1999	puitboomhoogte	mosterd	12-10-1999	10	St	2	"	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.9	300 w+0,1%Agral	55	B	50
55	NL	275	1999	vanggewas	suikerbiet	15-10-1999	1	geen	1	16:11	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
56	NL	276	1999	vanggewas	suikerbiet	15-10-1999	1	geen	2	16:11	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
57	NL	277	1999	vanggewas	suikerbiet	15-10-1999	2	geen	1	18:05	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
58	NL	278	1999	vanggewas	suikerbiet	15-10-1999	2	geen	2	18:05	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
59	NL	285	1999	vanggewas	suikerbiet	18-10-1999	6	geen	1	16:12	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
60	NL	286	1999	vanggewas	suikerbiet	18-10-1999	6	geen	2	16:12	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	6.0	316 w+0,1%Agral	55	B	50
61	NL	411	2000	vanggewas	aardappel	12-09-2000	1	geen	1	9:00	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0,1%Agral	50	C	50
62	NL	412	2000	vanggewas	aardappel	12-09-2000	1	geen	2	9:00	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0,1%Agral	50	C	50
63	NL	413	2000	vanggewas	aardappel	12-09-2000	2	geen	1	13:30	OWH	grond nder	Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0,1%Agral	50	C	50

64 NL	414	2000	vanggewas	aardappel	12-09-2000	2	geen	2	13:30	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
65 NL	415	2000	vanggewas	aardappel	12-09-2000	3	geen	1	14:20	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
66 NL	416	2000	vanggewas	aardappel	12-09-2000	3	geen	2	14:20	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
67 NL	417	2000	vanggewas	aardappel	12-09-2000	4	geen	1	18:28	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
68 NL	418	2000	vanggewas	aardappel	12-09-2000	4	geen	2	18:28	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
69 NL	419	2000	vanggewas	aardappel	15-09-2000	5	geen	1	13:10	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
70 NL	420	2000	vanggewas	aardappel	15-09-2000	5	geen	2	13:10	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
71 NL	421	2000	vanggewas	aardappel	15-09-2000	6	geen	1	14:45	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
72 NL	422	2000	vanggewas	aardappel	15-09-2000	6	geen	2	14:45	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
73 NL	423	2000	vanggewas	aardappel	15-09-2000	7	geen	1	17:00	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
74 NL	424	2000	vanggewas	aardappel	15-09-2000	7	geen	2	17:00	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
75 NL	425	2000	vanggewas	aardappel	15-09-2000	8	geen	1	18:25	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
76 NL	426	2000	vanggewas	aardappel	15-09-2000	8	geen	2	18:25	OWH	grondnder Twin Force	conv	24	XR 110.04	24	3	5.8	320 w+0.1%Agral	50	C	50
77 NL	619	2000	wasdifferentiatie	aardappel	27-06-2000	1	'	1	13:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
78 NL	620	2000	wasdifferentiatie	aardappel	27-06-2000	1	'	2	13:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
79 NL	621	2000	wasdifferentiatie	aardappel	27-06-2000	2	'	1	17:40	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
80 NL	622	2000	wasdifferentiatie	aardappel	27-06-2000	2	'	2	17:40	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
81 NL	623	2000	wasdifferentiatie	aardappel	28-06-2000	3	'	1	13:21	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
82 NL	624	2000	wasdifferentiatie	aardappel	28-06-2000	3	'	2	13:21	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
83 NL	627	2000	wasdifferentiatie	aardappel	19-07-2000	5	'	1	13:23	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
84 NL	628	2000	wasdifferentiatie	aardappel	19-07-2000	5	'	2	13:23	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
85 NL	631	2000	wasdifferentiatie	aardappel	05-09-2000	7	'	1	13:39	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
86 NL	632	2000	wasdifferentiatie	aardappel	05-09-2000	7	'	2	13:39	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
87 NL	633	2000	wasdifferentiatie	aardappel	05-09-2000	8	'	1	17:16	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
88 NL	634	2000	wasdifferentiatie	aardappel	05-09-2000	8	'	2	17:16	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
89 NL	683	2000	wasdifferentiatie	suikerbiet	04-08-2000	1	'	1	9:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
90 NL	684	2000	wasdifferentiatie	suikerbiet	04-08-2000	1	'	2	9:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
91 NL	685	2000	wasdifferentiatie	suikerbiet	09-08-2000	2	'	1	11:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
92 NL	686	2000	wasdifferentiatie	suikerbiet	09-08-2000	2	'	2	11:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
93 NL	687	2000	wasdifferentiatie	suikerbiet	10-08-2000	3	'	1	13:17	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	65	'	50
94 NL	688	2000	wasdifferentiatie	suikerbiet	10-08-2000	3	'	2	13:17	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	65	'	50
95 NL	691	2000	wasdifferentiatie	suikerbiet	17-08-2000	5	'	1	13:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	65	'	50
96 NL	692	2000	wasdifferentiatie	suikerbiet	17-08-2000	5	'	2	13:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	65	'	50
97 NL	693	2000	wasdifferentiatie	suikerbiet	18-09-2000	6	'	1	11:26	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
98 NL	694	2000	wasdifferentiatie	suikerbiet	18-09-2000	6	'	2	11:26	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
99 NL	695	2000	wasdifferentiatie	suikerbiet	18-09-2000	7	'	1	15:01	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
100 NL	696	2000	wasdifferentiatie	suikerbiet	18-09-2000	7	'	2	15:01	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	50	'	50
101 NL	697	2000	wasdifferentiatie	suikerbiet	03-10-2000	8	'	1	11:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	'	50
102 NL	698	2000	wasdifferentiatie	suikerbiet	03-10-2000	8	'	2	11:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	'	50
103 NL	747	2000	wasdifferentiatie	lelie	21-06-2000	1	'	1	13:28	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
104 NL	748	2000	wasdifferentiatie	lelie	21-06-2000	1	'	2	13:28	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
105 NL	749	2000	wasdifferentiatie	lelie	21-06-2000	2	'	1	16:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
106 NL	750	2000	wasdifferentiatie	lelie	21-06-2000	2	'	2	16:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
107 NL	751	2000	wasdifferentiatie	lelie	27-06-2000	3	'	1	13:48	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
108 NL	752	2000	wasdifferentiatie	lelie	27-06-2000	3	'	2	13:48	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
109 NL	753	2000	wasdifferentiatie	lelie	27-06-2000	4	'	1	16:45	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
110 NL	754	2000	wasdifferentiatie	lelie	27-06-2000	4	'	2	16:45	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
111 NL	755	2000	wasdifferentiatie	lelie	09-08-2000	5	'	1	11:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
112 NL	756	2000	wasdifferentiatie	lelie	09-08-2000	5	'	2	11:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
113 NL	757	2000	wasdifferentiatie	lelie	10-08-2000	6	'	1	13:12	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	25	'	50
114 NL	758	2000	wasdifferentiatie	lelie	10-08-2000	6	'	2	13:12	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	25	'	50
115 NL	761	2000	wasdifferentiatie	lelie	04-09-2000	8	'	1	14:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
116 NL	762	2000	wasdifferentiatie	lelie	04-09-2000	8	'	2	14:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
117 NL	763	2000	wasdifferentiatie	lelie	04-09-2000	9	'	1	16:32	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
118 NL	764	2000	wasdifferentiatie	lelie	04-09-2000	9	'	2	16:32	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	30	'	50
119 NL	765	2000	wasdifferentiatie	lelie	18-09-2000	10	'	1	11:27	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
120 NL	766	2000	wasdifferentiatie	lelie	18-09-2000	10	'	2	11:27	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
121 NL	767	2000	wasdifferentiatie	lelie	18-09-2000	11	'	1	15:03	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
122 NL	768	2000	wasdifferentiatie	lelie	18-09-2000	11	'	2	15:03	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	40	'	50
123 NL	827	2000	wasdifferentiatie	maïs	19-07-2000	2	'	1	16:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	70	'	50
124 NL	828	2000	wasdifferentiatie	maïs	19-07-2000	2	'	2	16:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	70	'	50
125 NL	831	2000	wasdifferentiatie	maïs	20-07-2000	4	'	1	14:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	70	'	50
126 NL	832	2000	wasdifferentiatie	maïs	20-07-2000	4	'	2	14:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	70	'	50
127 NL	833	2000	wasdifferentiatie	maïs	30-08-2000	5	'	1	17:08	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50
128 NL	834	2000	wasdifferentiatie	maïs	30-08-2000	5	'	2	17:08	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50
129 NL	835	2000	wasdifferentiatie	maïs	30-08-2000	6	'	1	18:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50
130 NL	836	2000	wasdifferentiatie	maïs	30-08-2000	6	'	2	18:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50
131 NL	839	2000	wasdifferentiatie	maïs	04-09-2000	8	'	1	14:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50
132 NL	840	2000	wasdifferentiatie	maïs	04-09-2000	8	'	2	14:49	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	20	'	50

133	NL	841	2000 wasdifferentiatie	maïs	04-09-2000	9	*	1	16:33	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	20	*	50
134	NL	842	2000 wasdifferentiatie	maïs	04-09-2000	9	*	2	16:33	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	20	*	50
135	NL	891	2000 wasdifferentiatie	tarwe	15-06-2000	1	*	1	16:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
136	NL	892	2000 wasdifferentiatie	tarwe	15-06-2000	1	*	2	16:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
137	NL	893	2000 wasdifferentiatie	tarwe	15-06-2000	2	*	1	20:28	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
138	NL	894	2000 wasdifferentiatie	tarwe	15-06-2000	2	*	2	20:28	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
139	NL	895	2000 wasdifferentiatie	tarwe	16-06-2000	3	*	1	21:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
140	NL	896	2000 wasdifferentiatie	tarwe	16-06-2000	3	*	2	21:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
141	NL	897	2000 wasdifferentiatie	tarwe	21-06-2000	4	*	1	13:30	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
142	NL	898	2000 wasdifferentiatie	tarwe	21-06-2000	4	*	2	13:30	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
143	NL	899	2000 wasdifferentiatie	tarwe	21-06-2000	5	*	1	16:53	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
144	NL	900	2000 wasdifferentiatie	tarwe	21-06-2000	5	*	2	16:53	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
145	NL	901	2000 wasdifferentiatie	tarwe	28-06-2000	6	*	1	13:26	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
146	NL	902	2000 wasdifferentiatie	tarwe	28-06-2000	6	*	2	13:26	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
147	NL	903	2000 wasdifferentiatie	tarwe	28-06-2000	7	*	1	14:20	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
148	NL	904	2000 wasdifferentiatie	tarwe	28-06-2000	7	*	2	14:20	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
149	NL	907	2000 wasdifferentiatie	tarwe	20-07-2000	9	*	1	14:43	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
150	NL	908	2000 wasdifferentiatie	tarwe	20-07-2000	9	*	2	14:43	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
151	NL	909	2000 wasdifferentiatie	tarwe	04-08-2000	10	*	1	9:48	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	80	*	50
152	NL	910	2000 wasdifferentiatie	tarwe	04-08-2000	10	*	2	9:48	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	80	*	50
153	NL	1031	2001 wasdifferentiatie	aardappel	25-07-2001	1	*	1	15:23	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
154	NL	1032	2001 wasdifferentiatie	aardappel	25-07-2001	1	*	2	15:23	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
155	NL	1033	2001 wasdifferentiatie	aardappel	25-07-2001	2	*	1	16:31	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
156	NL	1034	2001 wasdifferentiatie	aardappel	25-07-2001	2	*	2	16:31	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
157	NL	1035	2001 wasdifferentiatie	aardappel	27-08-2001	6	*	1	16:57	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	*	*	50
158	NL	1036	2001 wasdifferentiatie	aardappel	27-08-2001	6	*	2	16:57	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	*	*	50
159	NL	1037	2001 wasdifferentiatie	aardappel	27-08-2001	7	*	1	19:15	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	*	*	50
160	NL	1038	2001 wasdifferentiatie	aardappel	27-08-2001	7	*	2	19:15	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	*	*	50
161	NL	1075	2001 wasdifferentiatie	suikerbiet	24-07-2001	1	*	1	17:22	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
162	NL	1076	2001 wasdifferentiatie	suikerbiet	24-07-2001	1	*	2	17:22	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
163	NL	1077	2001 wasdifferentiatie	suikerbiet	24-07-2001	2	*	1	18:14	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
164	NL	1078	2001 wasdifferentiatie	suikerbiet	24-07-2001	2	*	2	18:14	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	30	*	50
165	NL	1079	2001 wasdifferentiatie	suikerbiet	17-08-2001	3	*	1	11:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
166	NL	1080	2001 wasdifferentiatie	suikerbiet	17-08-2001	3	*	2	11:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	60	*	50
169	NL	1085	2001 wasdifferentiatie	suikerbiet	15-10-2001	6	*	1	14:03	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
170	NL	1086	2001 wasdifferentiatie	suikerbiet	15-10-2001	6	*	2	14:03	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
171	NL	1089	2001 wasdifferentiatie	suikerbiet	02-11-2001	8	*	1	17:18	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
172	NL	1090	2001 wasdifferentiatie	suikerbiet	02-11-2001	8	*	2	17:18	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
173	NL	1091	2001 wasdifferentiatie	suikerbiet	05-11-2001	9	*	1	14:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
174	NL	1092	2001 wasdifferentiatie	suikerbiet	05-11-2001	9	*	2	14:47	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	70	*	50
175	NL	1147	2001 wasdifferentiatie	lelie	29-05-2001	2	*	1	20:22	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
176	NL	1148	2001 wasdifferentiatie	lelie	29-05-2001	2	*	2	20:22	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
177	NL	1149	2001 wasdifferentiatie	lelie	30-05-2001	3	*	1	10:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
178	NL	1150	2001 wasdifferentiatie	lelie	30-05-2001	3	*	2	10:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
179	NL	1151	2001 wasdifferentiatie	lelie	30-05-2001	4	*	1	13:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
180	NL	1152	2001 wasdifferentiatie	lelie	30-05-2001	4	*	2	13:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
181	NL	1153	2001 wasdifferentiatie	lelie	04-07-2001	5	*	1	20:41	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
182	NL	1154	2001 wasdifferentiatie	lelie	04-07-2001	5	*	2	20:41	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
183	NL	1155	2001 wasdifferentiatie	lelie	05-07-2001	6	*	1	10:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
184	NL	1156	2001 wasdifferentiatie	lelie	05-07-2001	6	*	2	10:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	50	*	50
185	NL	1157	2001 wasdifferentiatie	lelie	24-07-2001	7	*	1	17:24	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
186	NL	1158	2001 wasdifferentiatie	lelie	24-07-2001	7	*	2	17:24	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
187	NL	1159	2001 wasdifferentiatie	lelie	24-07-2001	8	*	1	18:15	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
188	NL	1160	2001 wasdifferentiatie	lelie	24-07-2001	8	*	2	18:15	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	55	*	50
189	NL	1209	2001 wasdifferentiatie	maïs	04-07-2001	1	*	1	20:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	25	*	50
190	NL	1210	2001 wasdifferentiatie	maïs	04-07-2001	1	*	2	20:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	25	*	50
191	NL	1211	2001 wasdifferentiatie	maïs	05-07-2001	2	*	1	10:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	25	*	50
192	NL	1212	2001 wasdifferentiatie	maïs	05-07-2001	2	*	2	10:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	25	*	50
193	NL	1275	2001 wasdifferentiatie	tarwe	30-05-2001	1	*	1	10:39	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	22.5	*	50
194	NL	1276	2001 wasdifferentiatie	tarwe	30-05-2001	1	*	2	10:39	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	22.5	*	50
195	NL	1277	2001 wasdifferentiatie	tarwe	30-05-2001	2	*	1	13:58	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	22.5	*	50
196	NL	1278	2001 wasdifferentiatie	tarwe	30-05-2001	2	*	2	13:58	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	22.5	*	50
197	NL	1279	2001 wasdifferentiatie	tarwe	17-07-2001	3	*	1	13:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0,1%Agral	75	*	50

198	NL	1280	2001	wasdifferentiatie	tarwe	17-07-2001	3	*	2	13:46	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	75	*	50
199	NL	1285	2001	wasdifferentiatie	tarwe	16-08-2001	6	*	1	19:34	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
200	NL	1286	2001	wasdifferentiatie	tarwe	16-08-2001	6	*	2	19:34	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
201	NL	1287	2001	wasdifferentiatie	tarwe	17-08-2001	7	*	1	11:56	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
202	NL	1288	2001	wasdifferentiatie	tarwe	17-08-2001	7	*	2	11:56	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
203	NL	1289	2001	wasdifferentiatie	tarwe	17-08-2001	8	*	1	13:32	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
204	NL	1290	2001	wasdifferentiatie	tarwe	17-08-2001	8	*	2	13:32	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	80	*	50
205	NL	1291	2001	wasdifferentiatie	tarwe	28-08-2001	9	*	1	16:35	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	*	*	50
206	NL	1292	2001	wasdifferentiatie	tarwe	28-08-2001	9	*	2	16:35	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	300 w+0.1%Agral	*	*	50
207	NL	1455	2002	Rau/Delvano	aardappel	19-07-2002	1	XR-L	1	11:56	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	75	B	50
208	NL	1456	2002	Rau/Delvano	aardappel	19-07-2002	1	XR-L	2	11:56	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	75	B	50
209	NL	1457	2002	Rau/Delvano	aardappel	19-07-2002	2	XR-L	1	14:44	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	75	B	50
210	NL	1458	2002	Rau/Delvano	aardappel	19-07-2002	2	XR-L	2	14:44	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	75	B	50
211	NL	1461	2002	Rau/Delvano	aardappel	16-08-2002	5	XR-L	1	10:58	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	80	C	50
212	NL	1462	2002	Rau/Delvano	aardappel	16-08-2002	5	XR-L	2	10:58	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	80	C	50
213	NL	1463	2002	Rau/Delvano	aardappel	27-08-2002	6	XR-L	1	16:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
214	NL	1464	2002	Rau/Delvano	aardappel	27-08-2002	6	XR-L	2	16:51	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
215	NL	1465	2002	Rau/Delvano	aardappel	27-08-2002	7	XR-L	1	17:05	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
216	NL	1466	2002	Rau/Delvano	aardappel	27-08-2002	7	XR-L	2	17:05	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
217	NL	1467	2002	Rau/Delvano	aardappel	29-08-2002	8	XR-L	1	13:02	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
218	NL	1468	2002	Rau/Delvano	aardappel	29-08-2002	8	XR-L	2	13:02	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
219	NL	1469	2002	Rau/Delvano	aardappel	29-08-2002	9	XR-L	1	18:06	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
220	NL	1470	2002	Rau/Delvano	aardappel	29-08-2002	9	XR-L	2	18:06	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
221	NL	1471	2002	Rau/Delvano	aardappel	30-08-2002	10	XR-L	1	11:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
222	NL	1472	2002	Rau/Delvano	aardappel	30-08-2002	10	XR-L	2	11:37	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
223	NL	1473	2002	Rau/Delvano	aardappel	30-08-2002	11	XR-L	1	15:33	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
224	NL	1474	2002	Rau/Delvano	aardappel	30-08-2002	11	XR-L	2	15:33	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
225	NL	1475	2002	Rau/Delvano	aardappel	03-09-2002	15	XR-L	1	16:12	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
226	NL	1476	2002	Rau/Delvano	aardappel	03-09-2002	15	XR-L	2	16:12	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
227	NL	1477	2002	Rau/Delvano	aardappel	03-09-2002	16	XR-L	1	16:57	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
228	NL	1478	2002	Rau/Delvano	aardappel	03-09-2002	16	XR-L	2	16:57	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	60	C	50
229	NL	1481	2002	Rau/Delvano	aardappel	04-09-2002	18	XR-L	1	17:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	65	C	50
230	NL	1482	2002	Rau/Delvano	aardappel	04-09-2002	18	XR-L	2	17:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	325 w+0.1%Agral	65	C	50
231	NL	1697	2003	rijsnelheid	aardappel	10-07-2003	1	XR-L-6	1	10:18	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	B	50
232	NL	1698	2003	rijsnelheid	aardappel	10-07-2003	1	XR-L-6	2	10:18	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	B	50
233	NL	1701	2003	rijsnelheid	aardappel	31-07-2003	4	XR-L-6	1	10:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
234	NL	1702	2003	rijsnelheid	aardappel	31-07-2003	4	XR-L-6	2	10:52	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
235	NL	1703	2003	rijsnelheid	aardappel	31-07-2003	5	XR-L-6	1	16:04	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
236	NL	1704	2003	rijsnelheid	aardappel	31-07-2003	5	XR-L-6	2	16:04	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
237	NL	1705	2003	rijsnelheid	aardappel	31-07-2003	6	XR-L-6	1	16:36	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
238	NL	1706	2003	rijsnelheid	aardappel	31-07-2003	6	XR-L-6	2	16:36	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
239	NL	1707	2003	rijsnelheid	aardappel	01-08-2003	7	XR-L-6	1	11:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
240	NL	1708	2003	rijsnelheid	aardappel	01-08-2003	7	XR-L-6	2	11:38	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
241	NL	1709	2003	rijsnelheid	aardappel	01-08-2003	8	XR-L-6	1	13:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
242	NL	1710	2003	rijsnelheid	aardappel	01-08-2003	8	XR-L-6	2	13:55	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	60	C	50
243	NL	1711	2003	rijsnelheid	aardappel	15-08-2003	9	XR-L-6	1	12:06	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	50	C	50
244	NL	1712	2003	rijsnelheid	aardappel	15-08-2003	9	XR-L-6	2	12:06	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	50	C	50
245	NL	1713	2003	rijsnelheid	aardappel	15-08-2003	10	XR-L-6	1	13:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	50	C	50
246	NL	1714	2003	rijsnelheid	aardappel	15-08-2003	10	XR-L-6	2	13:42	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	50	C	50
247	NL	1715	2003	rijsnelheid	aardappel	21-08-2003	11	XR-L-6	1	15:43	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	C	50
248	NL	1716	2003	rijsnelheid	aardappel	21-08-2003	11	XR-L-6	2	15:43	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	C	50
249	NL	1717	2003	rijsnelheid	aardappel	21-08-2003	12	XR-L-6	1	17:36	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	C	50
250	NL	1718	2003	rijsnelheid	aardappel	21-08-2003	12	XR-L-6	2	17:36	OWH	grond nder Twin Force	conv	24	XR 110.04	24	3	6	310 w+0.1%Agral	65	C	50
251	NL	1873	2003	sleepdoek	aardappel	26-06-2003	1	Hardi-XR	1	17:12	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
252	NL	1874	2003	sleepdoek	aardappel	26-06-2003	1	Hardi-XR	2	17:12	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
253	NL	1875	2003	sleepdoek	aardappel	26-06-2003	2	Hardi-XR	1	17:13	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
254	NL	1876	2003	sleepdoek	aardappel	26-06-2003	2	Hardi-XR	2	17:13	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
255	NL	1877	2003	sleepdoek	aardappel	26-06-2003	3	Hardi-XR	1	16:56	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
256	NL	1878	2003	sleepdoek	aardappel	26-06-2003	3	Hardi-XR	2	16:56	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
257	NL	1879	2003	sleepdoek	aardappel	26-06-2003	4	Hardi-XR	1	16:57	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
258	NL	1880	2003	sleepdoek	aardappel	26-06-2003	4	Hardi-XR	2	16:57	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	A	50
259	NL	1881	2003	sleepdoek	aardappel	09-07-2003	5	Hardi-XR	1	*	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	B	50
260	NL	1882	2003	sleepdoek	aardappel	09-07-2003	5	Hardi-XR	2	*	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311 w+0.1%Agral	65	B	50

261	NL	1883	2003	sleepdoek	aardappel	09-07-2003	6	Hardi-XR	1	-	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	65	B	50
262	NL	1884	2003	sleepdoek	aardappel	09-07-2003	6	Hardi-XR	2	-	OWH	grond nder Twin Force	conv	21	XR 110 04	21	3	6	311	w+0.1%Agral	65	B	50
263	NL	1885	2003	sleepdoek	aardappel	24-07-2003	7	Hardi-XR	1	19:31	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50
264	NL	1886	2003	sleepdoek	aardappel	24-07-2003	7	Hardi-XR	2	19:31	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50
265	NL	1887	2003	sleepdoek	aardappel	24-07-2003	8	Hardi-XR	1	19:32	OWH	grond nder Twin Force	conv	21	XR 110 04	21	3	6	311	w+0.1%Agral	60	C	50
266	NL	1888	2003	sleepdoek	aardappel	24-07-2003	8	Hardi-XR	2	19:32	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50
267	NL	1889	2003	sleepdoek	aardappel	25-07-2003	9	Hardi-XR	1	16:41	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50
268	NL	1890	2003	sleepdoek	aardappel	25-07-2003	9	Hardi-XR	2	16:41	OWH	grond nder Twin Force	conv	21	XR 110 04	21	3	6	311	w+0.1%Agral	60	C	50
269	NL	1891	2003	sleepdoek	aardappel	25-07-2003	10	Hardi-XR	1	16:41	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50
270	NL	1892	2003	sleepdoek	aardappel	25-07-2003	10	Hardi-XR	2	16:41	OWH	grond nder Twin Force	conv	21	XR 110.04	21	3	6	311	w+0.1%Agral	60	C	50

	Temp. °C Temp.	LFrel. % RH	Wind-richtung wind direction		Windgesch wind speec	0.50 m 0.5	1 m 1	1.25 m 1.25	1.75 m 1.5	2 m 2	2.25 m 2.25	2.75 m 2.5	3 m 3	3.25 m 3.25	3.75 m 3.5	4 m 4	4.25 m 4.25	4.75 m 4.5	5 m 5	5.25 m 5.25	5.5 m 5.5	7.75 m 7.75	10 m 10.25	15 m 15.25	20 m 20.25	30 m 30.25
*	15	67	21	*	1.2			0.44			0.20			0.13			0.08			0.07		0.13	0.04	0.02	0.01	0.02
*	15	67	21	*	1.2			0.89			0.27			0.11			0.11			0.08		0.09	0.03	0.02	0.02	0.02
*	15	67	21	*	1.2			1.07			0.20			0.16			0.13			0.09		0.09	0.05	0.02	0.02	0.01
*	15	67	21	*	1.2			1.73			0.76			0.43			0.14			0.08		0.08	0.04	0.03	0.01	0.02
*	15	67	21	*	1.2			1.84			0.19			0.08			0.09			0.10		0.03	0.04	0.01	0.01	0.07
*	15	67	21	*	1.2			3.40			0.62			0.22			0.15			0.09		0.04	0.04	0.01	0.01	0.01
*	17	57	10	*	1.7			0.31			0.20			0.19			0.13			0.22		0.08	0.04	0.02	0.02	0.01
*	17	57	10	*	1.7			0.40			0.09			0.12			0.12			0.08		0.03	0.02	0.03	0.01	0.01
*	17	57	10	*	1.7			0.42			0.11			0.17			0.09			0.07		0.04	0.04	0.02	0.04	0.04
*	17	57	10	*	1.7			0.47			0.30			0.12			0.11			0.12		0.04	0.04	0.03	0.01	0.02
*	17	57	10	*	1.7			1.87			0.51			0.18			0.18			0.13		0.10	0.06	0.05	0.01	0.01
*	17	57	10	*	1.7			1.95			0.74			0.18			0.19			0.10		0.07	0.06	0.04	0.02	0.01
*	10	82	4	*	2.1			0.23			0.25			0.15			0.09			0.08		0.05	0.05	0.04	0.04	0.04
*	10	82	4	*	2.1			0.27			0.18			0.13			0.14			0.05		0.06	0.06	0.07	0.02	0.02
*	10	82	4	*	2.1			0.28			0.15			0.16			0.15			0.08		0.05	0.05	0.04	0.02	0.02
*	10	82	4	*	2.1			0.31			0.30			0.18			0.12			0.09		0.04	0.04	0.05	0.06	0.01
*	10	82	4	*	2.1			0.32			0.30			0.27			0.15			0.13		0.06	0.06	0.05	0.04	0.01
*	10	82	4	*	2.1			0.54			0.15			0.13			0.20			0.12		0.06	0.06	0.04	0.02	0.01
19.4	18.9	*	4	1.4	1.6	33.84	19.94		10.33	*	2.75	*	*	1.27	*	*	0.99	*	*	0.76	*	0.39	0.22	0.16		
19.4	18.9	*	4	1.4	1.6	38.23	26.20		15.86	*	6.25	*	*	2.92	*	*	2.16	*	*	0.94	*	0.65	0.44	0.30		
22.5	21.3	67	23	2.0	2.5	27.48	15.40		3.52	*	1.84	*	*	1.24	*	*	1.13	*	*	0.68	*	0.34	0.22	0.12		
22.5	21.3	67	23	2.0	2.5	40.09	16.57		4.27	*	2.12	*	*	1.89	*	*	2.18	*	*	1.12	*	0.34	0.42	0.13		
22.9	21.7	57	10	3.0	4.4	53.70	39.52		22.81	*	7.81	*	*	2.37	*	*	1.97	*	*	2.06	*	0.68	0.50	0.02		
22.9	21.7	57	10	3.0	4.4	41.59	16.63		7.85	*	2.98	*	*	2.02	*	*	1.90	*	*	1.07	*	0.88	0.79	0.45		
19.3	19.0	56	-15	2.3	3.1	38.18	23.18		11.14	*	6.94	*	*	4.76	*	*	2.79	*	*	2.02	*	1.18	0.91	0.54		
19.3	19.0	56	-15	2.3	3.1	53.72	35.05		18.85	*	21.15	*	*	8.21	*	*	3.22	*	*	1.94	*	1.19	0.95	0.71		
19.4	19.2	58	-10	2.2	3.1	43.85	24.18		15.14	*	4.07	*	*	2.65	*	*	2.14	*	*	1.50	*	0.81	0.48	0.36		
19.4	19.2	58	-10	2.2	3.1	59.96	35.79		18.10	*	6.74	*	*	2.32	*	*	1.35	*	*	0.86	*	0.51	0.35	0.23		
17.9	18.0	*	-2	2.3	3.0	29.09	19.75		16.96	*	6.57	*	*	2.58	*	*	2.10	*	*	1.20	*	0.82	0.68	0.35		
17.9	18.0	*	-2	2.3	3.0	25.83	20.18		13.77	*	3.76	*	*	1.48	*	*	0.96	*	*	0.90	*	0.63	0.47	0.31		
24.3	23.5	38	7	2.3	3.1	45.94	30.55		15.40	*	7.32	*	*	2.26	*	*	1.28	*	*	0.96	*	0.45	0.29	0.20		
24.3	23.5	38	7	2.3	3.1	24.28	19.67		5.51	*	2.23	*	*	0.77	*	*	0.57	*	*	0.38	*	0.28	0.24	0.20		
24.1	23.4	45	0	2.6	3.4	37.93	22.64		7.41	*	2.36	*	*	1.48	*	*	1.39	*	*	1.44	*	0.83	0.75	0.33		
24.1	23.4	45	0	2.6	3.4	60.22	20.68		5.26	*	1.41	*	*	1.40	*	*	1.56	*	*	1.26	*	0.97	0.82	0.55		
24.4	23.6	48	-15	2.2	3.0	42.69	16.80		4.93	*	4.56	*	*	4.66	*	*	2.88	*	*	2.53	*	1.31	1.04	0.88		
24.4	23.6	48	-15	2.2	3.0	47.28	33.53		33.70	*	10.51	*	*	2.89	*	*	2.55	*	*	2.25	*	1.38	0.93	0.51		
19.0	19.3	96	30	2.9	3.9	45.82	21.95		4.32	*	2.98	*	*	1.11	*	*	0.48	*	*	0.36	*	0.23	0.28	0.30		
19.0	19.3	96	30	2.9	3.9	41.77	21.63		6.58	*	2.27	*	*	2.58	*	*	2.80	*	*	1.23	*	0.78	0.25	0.23		
14.4	14.2	75	11	2.8	3.8	9.59	25.91		15.32	*	6.87	*	*	3.10	*	*	1.35	*	*	1.08	*	0.53	0.39	0.30		
14.4	14.2	75	11	2.8	3.8	24.98	29.31		17.52	*	2.46	*	*	1.69	*	*	1.44	*	*	1.75	*	1.01	0.54	0.43		
13.5	13.6	80	13	2.2	2.7	32.87	33.27		8.72	*	1.27	*	*	0.92	*	*	0.62	*	*	0.44	*	0.21	0.07	0.09		
13.5	13.6	80	13	2.2	2.7	28.63	16.95		3.02	*	1.06	*	*	1.09	*	*	0.48	*	*	0.21	*	0.13	0.18	0.10		
13.2	13.3	84	30	3.1	3.5	30.48	21.69		6.24	*	1.96	*	*	1.53	*	*	1.32	*	*	1.07	*	0.66	0.67	0.31		
13.2	13.3	84	30	3.1	3.5	24.52	17.65		5.14	*	2.48	*	*	2.91	*	*	2.70	*	*	1.80	*	0.69	0.48	0.27		
12.3	12.5	92	15	3.7	4.4	33.15	42.65		21.29	*	6.86	*	*	4.56	*	*	2.43	*	*	1.65	*	1.16	0.49	0.14		
12.3	12.5	92	15	3.7	4.4	39.99	41.87		20.83	*	15.41	*	*	5.39	*	*	2.16	*	*	2.20	*	0.88	0.47	0.40		
12.9	12.9	79	16	3.2	4.2	21.38	17.20		4.30	*	1.43	*	*	1.03	*	*	0.78	*	*	0.55	*	0.41	0.28	0.16		
12.9	12.9	79	16	3.2	4.2	34.94	25.33		4.51	*	0.99	*	*	0.52	*	*	0.41	*	*	0.31	*	0.18	0.17	0.10		
11.3	11.7	90	12	2.0	2.7	25.79	17.43		6.69	*	1.99	*	*	0.79	*	*	0.87	*	*	0.42	*	0.13	0.15	0.22		
11.3	11.7	90	12	2.0	2.7	50.29	34.11		17.36	*	3.49	*	*	1.07	*	*	0.83	*	*	0.81	*	0.40	0.20	0.18		
15.6	14.6	71	14	2.3	3.0	22.00	11.42		3.19	*	1.20	*	*	0.52	*	*	0.34	*	*	0.35	*	0.20	0.29	0.20		
15.6	14.6	71	14	2.3	3.0	24.71	14.17		2.23	*	0.57	*	*	0.82	*	*	0.50	*	*	0.28	*	0.37	0.05	0.12		
15.5	14.7	71	15	2.3	3.2	40.78	30.18		13.91	*	5.08	*	*	2.58	*	*	2.07	*	*	1.63	*	0.98	0.49	0.22		
15.5	14.7	71	15	2.3	3.2	46.18	43.02		19.59	*	6.59	*	*	3.23	*	*	2.82	*	*	2.34	*	1.07	0.58	0.24		
12.8	12.8	82	18	1.7	2.3	22.67	12.76		2.78	*	1.26	*	*	0.63	*	*	0.57	*	*	0.42	*	0.33	0.27	0.21		
12.8	12.8	82	18	1.7	2.3	21.56	8.97		2.59	*	1.21	*	*	0.82	*	*	0.56	*	*	0.48	*	0.37	0.25	0.14		
11.0	11.2	86	-11	0.7	0.8	23.28	14.28		3.44	*	1.43	*	*	0.86	*	*	0.56	*	*	0.45	*	0.34	0.23	0.09		
11.0	11.2	86	-11	0.7	0.8	20.64	13.00		2.33	*	0.73	*	*	0.73	*	*	0.50	*	*	0.36	*	0.24	0.16	0.07		
10.8	10.5	59	19	4.1	5.2	18.50	16.89		6.93	*	2.88	*	*	2.93	*	*	3.33	*	*	3.01	*	2.30	1.29	1.07		
10.8	10.5	59	19	4.1	5.2	24.84	14.37		4.94	*	2.31	*	*	1.66	*	*	1.44	*	*	2.00	*	1.34	1.46	1.12		
17.4	17.3	92	13	2.0	2.7	32.19	13.26		4.37	*	2.00	*	*	1.26	*	*	0.87	*	*	0.77	*	0.29	0.16	0.29		
17.4	17.3	92	13	2.0	2.7	32.63	7.47		1.20	*	0.96	*	*	0.47	*	*	0.52	*	*	0.38	*	0.31	0.21	0.16		
18.3	18.6	92	-30	2.8	3.5	28.02	18.41		3.98	*	3.58	*	*	1.68	*	*	0.82	*	*	0.79	*	0.20	0.04	0.06		

18.3	18.6	92	-30	2.8	3.5	20.68	14.38	7.13	-	2.72	-	-	1.32	-	-	0.88	-	-	0.55	-	0.69	0.16	0.08
18.8	19.0	86	-16	3.4	3.9	43.68	36.46	28.98	-	7.91	-	-	9.04	-	-	4.65	-	-	5.00	-	2.40	1.31	0.71
16.8	19.0	86	-16	3.4	3.9	51.03	49.77	36.56	-	9.78	-	-	8.34	-	-	5.34	-	-	3.30	-	1.35	2.00	0.37
18.3	18.4	86	-8	3.4	4.1	62.99	34.67	10.79	-	7.25	-	-	8.14	-	-	3.37	-	-	2.07	-	2.07	1.44	0.68
18.3	18.4	86	-8	3.4	4.1	36.23	22.89	10.92	-	3.74	-	-	3.30	-	-	2.64	-	-	2.36	-	1.20	0.53	0.46
20.1	19.6	-	23	2.9	4.2	47.93	14.14	2.76	-	1.96	-	-	0.94	-	-	0.99	-	-	0.71	-	0.50	0.43	0.23
20.1	19.6	-	23	2.9	4.2	38.00	15.98	9.24	-	4.36	-	-	2.61	-	-	1.46	-	-	2.02	-	0.62	0.53	0.26
21.0	20.5	73	7	3.9	5.0	37.02	20.98	5.95	-	1.83	-	-	1.76	-	-	2.42	-	-	1.73	-	0.98	0.98	0.53
21.0	20.5	73	7	3.9	5.0	52.09	21.27	13.90	-	13.33	-	-	1.03	-	-	1.52	-	-	1.46	-	0.85	0.47	0.24
19.7	19.6	73	-5	3.1	3.9	29.04	15.29	6.33	-	2.37	-	-	1.00	-	-	0.78	-	-	0.66	-	0.51	0.37	0.20
19.7	19.6	73	-5	3.1	3.9	36.33	16.42	7.69	-	3.33	-	-	2.25	-	-	1.04	-	-	0.89	-	0.98	0.61	0.29
19.6	19.5	84	-22	2.2	2.7	28.30	12.78	5.78	-	4.15	-	-	2.80	-	-	2.18	-	-	1.38	-	0.94	0.83	0.52
19.6	19.5	84	-22	2.2	2.7	36.15	12.99	8.43	-	3.56	-	-	2.59	-	-	2.21	-	-	3.09	-	1.80	1.15	0.68
17.5	15.4	54	-16	3.4	4.4	26.47	5.20	1.14	-	0.29	-	-	0.23	-	-	0.45	-	-	0.29	-	0.24	0.23	0.22
17.5	15.4	54	-16	3.4	4.4	33.02	13.91	0.91	-	0.35	-	-	0.35	-	-	0.60	-	-	0.66	-	0.26	0.25	0.45
15.1	14.2	58	13	2.5	3.1	33.61	20.59	9.02	-	4.03	-	-	2.84	-	-	1.98	-	-	1.48	-	0.92	0.62	0.42
15.1	14.2	58	13	2.5	3.1	42.27	21.39	13.03	-	5.96	-	-	2.62	-	-	1.79	-	-	1.48	-	0.72	0.61	0.39
15.9	14.5	53	5	2.8	3.6	37.01	18.19	5.49	-	2.97	-	-	2.14	-	-	1.39	-	-	0.98	-	0.72	0.34	0.42
15.9	14.5	53	5	2.8	3.6	32.30	15.72	5.53	-	2.48	-	-	1.86	-	-	1.56	-	-	1.50	-	0.72	0.59	0.53
18.9	17.8	68	-25	3.7	5.1	31.54	14.05	3.12	-	3.52	-	-	3.32	-	-	3.04	-	-	1.68	-	0.98	0.42	0.30
18.9	17.8	68	-25	3.7	5.1	25.16	7.53	1.03	-	0.97	-	-	0.83	-	-	0.83	-	-	1.11	-	1.11	0.82	0.43
21.0	20.1	89	17	1.8	2.1	27.40	18.00	4.87	-	2.77	-	-	1.44	-	-	0.97	-	-	0.73	-	0.33	0.32	0.19
21.0	20.1	89	17	1.8	2.1	36.90	16.26	4.01	-	1.83	-	-	1.03	-	-	0.74	-	-	0.51	-	0.29	0.22	0.14
18.0	17.8	73	18	1.3	1.9	28.12	16.85	2.27	-	0.94	-	-	0.64	-	-	0.47	-	-	0.61	-	0.24	0.15	0.07
18.0	17.8	73	18	1.3	1.9	27.81	15.27	3.66	-	1.16	-	-	0.69	-	-	0.50	-	-	0.36	-	0.24	0.15	0.10
19.2	18.4	-	4	1.7	2.1	9.31	12.23	3.02	-	1.05	-	-	0.99	-	-	0.72	-	-	0.76	-	0.31	0.27	0.04
19.2	18.4	-	4	1.7	2.1	8.72	10.31	3.01	-	2.38	-	-	0.82	-	-	0.56	-	-	0.58	-	0.43	0.35	0.14
22.0	21.6	61	24	1.9	2.5	18.07	16.12	4.26	-	2.40	-	-	0.85	-	-	0.70	-	-	0.73	-	0.28	0.17	0.14
22.0	21.6	61	24	1.9	2.5	33.07	19.75	5.78	-	2.41	-	-	1.57	-	-	1.22	-	-	0.74	-	0.28	0.14	0.07
19.8	19.4	80	15	2.8	3.9	19.33	18.57	4.99	-	3.44	-	-	2.13	-	-	1.78	-	-	1.00	-	1.02	0.65	0.32
19.8	19.4	80	15	2.8	3.9	8.53	12.56	5.59	-	3.51	-	-	1.70	-	-	1.27	-	-	0.94	-	0.47	0.31	0.30
22.1	21.0	-	-22	2.9	3.8	14.36	26.10	4.66	-	1.24	-	-	1.18	-	-	1.14	-	-	1.26	-	0.85	0.62	0.66
22.1	21.0	-	-22	2.9	3.8	14.41	13.29	2.65	-	2.16	-	-	1.49	-	-	1.06	-	-	0.67	-	0.41	0.34	0.26
17.9	17.5	-	30	3.4	4.1	17.60	11.53	5.52	-	3.62	-	-	1.99	-	-	1.62	-	-	1.08	-	0.68	0.48	0.29
17.9	17.5	-	30	3.4	4.1	18.81	11.81	4.86	-	2.71	-	-	1.45	-	-	2.01	-	-	0.66	-	0.77	0.66	0.36
17.9	17.9	-	20	3.3	4.2	25.95	11.12	4.40	-	2.93	-	-	1.54	-	-	1.13	-	-	1.05	-	0.47	0.36	0.19
17.9	17.9	-	20	3.3	4.2	16.77	12.79	2.44	-	2.30	-	-	1.06	-	-	1.33	-	-	0.93	-	0.62	0.90	0.24
14.9	14.9	-	-26	1.5	1.9	7.19	12.15	3.38	-	1.95	-	-	1.01	-	-	0.85	-	-	0.39	-	0.34	0.28	0.17
14.9	14.9	-	-26	1.5	1.9	7.04	10.27	5.18	-	3.31	-	-	1.81	-	-	0.67	-	-	0.55	-	0.40	0.15	0.09
23.8	22.6	53	-17	3.0	3.7	55.10	17.84	2.56	-	1.80	-	-	1.54	-	-	0.74	-	-	0.74	-	0.27	0.37	0.50
23.8	22.6	53	-17	3.0	3.7	52.64	20.83	7.13	-	2.40	-	-	1.43	-	-	1.26	-	-	0.74	-	0.50	0.30	0.24
17.8	17.6	78	4	3.5	4.8	54.90	35.10	12.73	-	9.36	-	-	5.28	-	-	3.07	-	-	2.54	-	2.19	0.72	0.57
17.8	17.6	78	4	3.5	4.8	48.28	25.05	13.37	-	4.63	-	-	2.45	-	-	1.27	-	-	0.91	-	1.06	1.00	0.84
19.5	16.8	53	-27	3.6	4.6	26.01	7.19	1.98	-	0.69	-	-	0.26	-	-	0.13	-	-	0.13	-	0.13	0.13	0.02
19.5	16.8	53	-27	3.6	4.6	20.96	6.58	1.83	-	1.77	-	-	1.18	-	-	0.67	-	-	0.26	-	0.04	0.05	0.04
15.1	14.2	60	-2	2.0	2.8	21.64	9.68	1.82	-	1.57	-	-	1.35	-	-	0.91	-	-	0.57	-	0.26	0.25	0.13
15.1	14.2	60	-2	2.0	2.8	22.77	13.13	5.55	-	2.70	-	-	0.81	-	-	0.62	-	-	0.65	-	0.26	0.23	0.05
22.1	21.6	60	8	1.7	2.0	22.94	14.70	4.25	-	2.37	-	-	1.39	-	-	0.83	-	-	0.69	-	0.32	0.18	0.14
22.1	21.6	60	8	1.7	2.0	25.94	22.06	8.67	-	4.22	-	-	2.35	-	-	1.59	-	-	0.75	-	0.28	0.27	0.14
19.5	19.1	79	29	4.0	5.1	25.26	15.10	3.38	-	1.86	-	-	1.66	-	-	1.12	-	-	1.00	-	0.56	0.42	0.42
19.5	19.1	79	29	4.0	5.1	26.59	10.66	2.28	-	1.88	-	-	2.45	-	-	1.63	-	-	1.18	-	0.75	0.31	0.14
16.9	16.0	63	4	2.5	3.5	36.97	17.35	6.64	-	3.32	-	-	3.62	-	-	3.23	-	-	2.06	-	1.46	0.57	0.29
16.9	16.0	63	4	2.5	3.5	30.73	19.31	4.45	-	2.90	-	-	1.77	-	-	1.56	-	-	1.66	-	0.58	0.48	0.40
15.9	15.4	69	-9	2.8	3.5	22.68	21.61	7.33	-	1.84	-	-	0.85	-	-	0.46	-	-	0.34	-	0.28	0.23	0.12
15.9	15.4	69	-9	2.8	3.5	24.69	9.31	2.11	-	2.77	-	-	1.62	-	-	0.60	-	-	0.39	-	0.24	0.19	0.11
17.9	17.6	-	31	3.3	4.3	31.01	9.82	7.21	-	6.49	-	-	3.81	-	-	1.62	-	-	1.36	-	0.75	0.90	0.49
17.9	17.6	-	31	3.3	4.3	46.66	21.02	14.10	-	4.66	-	-	2.58	-	-	2.56	-	-	2.41	-	1.49	1.16	0.80
17.9	18.0	-	13	3.3	4.2	53.07	28.88	15.75	-	16.11	-	-	4.93	-	-	4.31	-	-	3.34	-	1.32	0.23	0.14
17.9	18.0	-	13	3.3	4.2	43.79	16.17	17.00	-	9.29	-	-	4.63	-	-	5.64	-	-	4.88	-	2.36	0.49	0.14
20.3	18.9	-	-26	3.1	3.9	37.13	12.46	0.55	-	0.67	-	-	0.34	-	-	0.33	-	-	0.19	-	0.17	0.17	0.12
20.3	18.9	-	-26	3.1	3.9	20.16	9.72	1.34	-	0.68	-	-	0.54	-	-	0.52	-	-	0.34	-	0.18	0.17	0.11
22.6	20.7	-	-30	2.9	4.3	20.17	9.64	1.13	-	0.43	-	-	0.58	-	-	0.64	-	-	0.66	-	0.74	1.05	0.14
22.6	20.7	-	-30	2.9	4.3	33.38	14.77	5.23	-	0.87	-	-	0.44	-	-	0.63	-	-	0.30	-	0.45	0.58	0.14
17.9	17.3	67	17	2.2	2.6	54.38	30.08	16.59		6.30			3.55			1.63			2.01		1.74	1.31	0.55
17.9	17.3	67	17	2.2	2.6	34.37	21.84	9.17		5.27			3.71			2.25			2.78		2.37	0.94	0.28
16.2	16.1	71	24	1.3	1.6	47.19	27.80	11.62		4.02			2.91			1.71			1.62		0.82	0.93	0.65
16.2	16.1	71	24	1.3	1.6	39.25	19.62	8.00		3.99			2.98			1.86			1.60		0.90	0.73	0.29
17.1	16.2	64	1	1.8	2.3	40.35	23.83	13.40		9.01			4.01			2.62			1.93		1.42	0.58	0.35
17.1	16.2	64	1	1.8	2.3	39.65	21.24	13.60		11.00			3.79			2.39			1.78		0.91	0.67	0.42

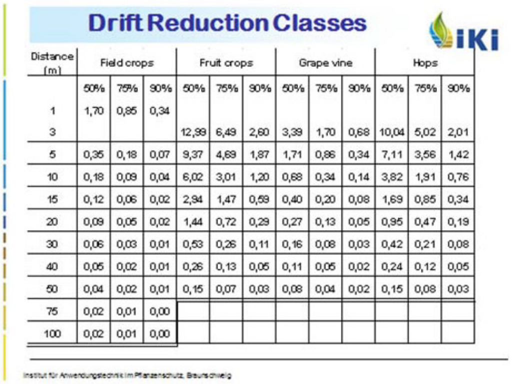
15.8	15.4	69	-9	3.1	4.0	46.39	27.88	10.59	6.60	3.25	2.02	0.85	0.93	0.68	0.47
15.8	15.4	69	-9	3.1	4.0	21.92	15.72	4.37	2.17	1.67	1.21	0.94	0.51	0.23	0.21
18.4	16.8	60	-26	3.7	4.7	15.64	9.07	3.89	2.23	0.99	0.32	0.24	0.49	0.49	0.49
18.4	16.8	60	-26	3.7	4.7	9.08	9.39	2.32	1.29	0.99	0.74	0.49	0.24	0.24	0.30
13.9	13.5	71	7	2.6	3.3	13.45	7.69	2.48	1.25	0.55	0.49	0.49	0.26	0.24	0.24
13.9	13.5	71	7	2.6	3.3	10.03	3.27	1.25	1.08	0.85	0.51	0.41	0.47	0.24	0.22
17.8	15.4	60	8	3.0	3.5	13.53	7.87	2.50	1.75	1.54	0.94	0.63	0.34	0.35	0.16
17.8	15.4	60	8	3.0	3.5	13.00	5.67	1.28	1.16	0.79	0.68	0.47	0.47	0.22	0.16
23.4	22.2	53	-22	3.0	3.9	11.55	6.47	0.94	0.79	0.31	0.18	0.16	0.22	0.06	0.00
23.4	22.2	53	-22	3.0	3.9	9.78	7.40	0.72	0.31	0.23	0.18	0.15	0.15	0.15	0.02
17.7	17.4	79	-7	3.5	4.5	16.64	12.91	4.73	3.92	2.54	1.85	1.74	0.96	0.69	0.62
17.7	17.4	79	-7	3.5	4.5	18.27	11.31	10.32	6.35	3.71	2.04	1.92	1.39	1.17	0.91
15.1	13.8	53	1	4.0	5.1	8.46	4.74	2.41	2.06	1.49	1.34	1.24	1.41	1.13	0.67
15.1	13.8	53	1	4.0	5.1	10.71	5.89	3.37	3.33	3.41	1.64	1.34	1.09	0.96	0.78
15.4	14.1	50	-20	3.3	4.3	6.88	1.46	0.66	0.57	0.70	0.46	0.45	0.28	0.14	0.14
15.4	14.1	50	-20	3.3	4.3	6.97	2.30	0.95	0.84	1.08	0.51	0.43	0.35	0.28	0.28
22.4	20.7		-24	2.4	3.4	14.09	13.25	4.92	1.01	0.24	0.11	0.11	0.12	0.05	0.03
22.4	20.7		-24	2.4	3.4	19.57	13.02	4.96	1.92	0.57	0.21	0.14	0.02	0.06	0.01
19.7	18.7		1	1.8	2.2	19.62	10.51	2.69	2.56	1.03	0.60	0.35	0.29	0.21	0.29
19.7	18.7		1	1.8	2.2	17.04	7.99	3.47	2.37	1.63	1.07	0.60	0.31	0.33	0.29
23.9	22.8	62	-1	2.3	2.9	40.57	29.09	13.04	6.28	1.81	1.47	1.34	1.09	0.51	0.23
23.9	22.8	62	-1	2.3	2.9	24.36	12.49	7.36	6.66	2.89	1.70	1.40	0.71	0.58	0.23
22.8	21.8	66	-11	1.6	2.0	22.84	13.12	4.21	1.33	0.71	0.45	0.33	0.18	0.07	0.02
22.8	21.8	66	-11	1.6	2.0	36.52	25.56	8.86	5.41	2.22	0.73	0.26	0.19	0.13	0.05
17.8	17.4	71	-2	2.1	3.4	32.52	20.48	20.38	7.08	3.37	2.23	1.56	1.34	0.90	0.50
17.8	17.4	71	-2	2.1	3.4	25.18	15.38	10.32	2.86	2.16	2.05	1.87	1.48	1.00	0.60
18.8	17.7	70	-24	2.0	3.4	26.81	10.90	8.87	3.23	2.77	3.30	2.17	1.55	1.33	1.18
18.8	17.7	70	-24	2.0	3.4	27.66	17.58	9.05	4.30	3.75	2.86	2.48	2.00	1.99	1.33
24.1	22.5		-7	1.6	2.6	17.46	14.47	3.98	3.79	1.67	1.25	1.00	0.48	0.32	0.17
24.1	22.5	0	-7	1.6	2.6	10.77	6.24	2.53	1.64	1.12	0.79	0.69	0.39	0.33	0.21
22.3	21.4		31	1.9	2.3	23.19	23.92	12.94	2.92	0.56	0.22	0.13	0.06	0.02	0.01
22.3	21.4	0	31	1.9	2.3	16.34	18.34	8.42	4.40	0.57	0.45	0.41	0.10	0.05	0.01
20.1	19.5		-24	2.2	2.9	0.57	0.42	0.48	0.36	0.31	0.24	0.19	0.09	0.07	0.05
20.1	19.5	0	-24	2.2	2.9	2.45	2.56	0.36	0.29	0.24	0.19	0.20	0.13	0.13	0.07
		73				18.77	14.11	5.72	3.19	1.54	0.99	0.71	0.47	0.31	0.27
		73				20.41	6.10	3.56	2.18	1.55	1.20	0.85	0.57	0.37	0.27
		82				26.75	16.27	3.94	0.93	0.86	0.70	0.52	0.37	0.25	0.16
		82				12.57	11.73	4.01	1.24	0.52	0.34	0.38	0.32	0.23	0.20
10.5	10.4	67	26	2.4	3.0	25.68	12.18	10.34	1.64	0.40	0.30	0.20	0.13	0.12	0.06
10.5	10.4	67	26	2.4	3.0	12.36	10.82	7.62	0.95	0.35	0.31	0.21	0.11	0.11	0.09
16.4		58	6	3.3	3.9	60.30	37.67	12.50	7.90	3.85	2.79	2.46	1.81	1.03	0.48
16.4		58	6	3.3	3.9	54.14	26.43	17.54	13.68	12.40	4.76	2.67	1.66	1.21	0.68
						43.20	18.97	9.13	4.18	2.76	1.46	0.85	0.54	0.53	0.39
						46.74	19.70	5.53	2.38	1.57	1.12	0.82	0.70	0.70	0.34
22.7	20.8	50	30	2.8	3.3	44.31	21.85	10.20	6.16	2.34	1.75	0.92	0.79	0.65	0.56
22.7	20.8	50	30	2.8	3.3	44.37	17.23	9.53	4.20	2.03	1.36	1.21	0.87	0.98	0.48
23.7		56	24	1.8	2.2	12.97	9.68	1.30	0.44	0.31	0.30	0.23	0.13	0.08	0.05
23.7		56	24	1.8	2.2	15.56	5.00	2.00	0.77	0.31	0.21	0.20	0.11	0.08	0.05
		69		2.5	3.1	14.41	7.76	1.68	0.73	0.85	0.75	0.84	0.46	0.23	0.13
		69		2.5	3.1	15.48	3.22	0.97	1.37	1.66	1.67	0.66	0.33	0.33	0.15
23.9	22.6		-1	1.7	2.3	11.65	2.42	1.61	1.18	0.83	0.74	0.63	0.43	0.28	0.19
23.9	22.6		-1	1.7	2.3	16.11	5.49	2.24	0.78	0.57	0.56	0.46	0.34	0.23	0.17
22.5	21.6		13	1.4	1.9	21.48	8.93	4.40	1.38	0.80	0.75	0.70	1.10	0.46	0.28
22.5	21.6		13	1.4	1.9	26.08	13.10	7.90	3.29	1.84	1.12	0.80	0.41	0.33	0.38
23.5		56	20	1.9	2.5	21.61	11.90	1.33	0.93	0.38	0.23	0.12	0.07	0.05	0.06
23.5		56	20	1.9	2.5	20.13	9.17	1.23	1.05	0.26	0.28	0.28	0.10	0.05	0.05
		69		2.9	3.7	24.75	7.89	0.97	0.46	0.38	0.29	0.19	0.13	0.09	0.03
		69		2.9	3.7	19.55	5.77	0.74	0.46	0.30	0.23	0.23	0.14	0.08	0.06
						23.40	6.41	1.88	0.95	1.09	0.54	0.60	0.32	0.22	0.21
						49.70	13.80	7.20	3.45		1.98	1.15	0.70	0.60	0.34
22.8	21.3	50	22	2.8	3.1	42.67	20.21	12.42	8.68	6.04	3.29	1.92	0.81	0.42	0.26
22.8	21.3	50	22	2.8	3.1	28.62	15.21	7.13	3.40	2.35	1.21	0.90	0.95	0.60	0.31
20.0	18.7		26	2.1	3.0	32.99	20.26	10.31	1.79	0.81	0.60	0.31	0.18	0.12	0.04

20.0	18.7	-	26	2.1	3.0	34.66	19.01	6.88	-	1.35	-	-	1.08	-	-	0.71	-	-	0.42	-	0.21	0.15	0.05
19.1	19.0	75	-26	1.9	2.3	20.08	7.24	1.47	-	0.56	-	-	0.28	-	-	0.17	-	-	0.11	-	0.04	0.02	0.02
19.1	19.0	75	-26	1.9	2.3	14.00	4.82	0.72	-	0.13	-	-	0.10	-	-	0.10	-	-	0.09	-	0.08	0.05	0.02
20.1	19.7	-	-20	2.2	2.8	21.77	10.92	3.92	-	1.86	-	-	0.99	-	-	0.80	-	-	0.73	-	0.53	0.33	0.27
20.1	19.7	-	-20	2.2	2.8	18.10	8.30	2.70	-	1.37	-	-	1.10	-	-	1.05	-	-	0.87	-	0.68	0.53	0.32
21.3	20.2	61	-27	2.9	3.8	19.35	8.98	4.77	-	0.64	-	-	0.57	-	-	0.79	-	-	0.66	-	0.51	0.26	0.22
21.3	20.2	61	-27	2.9	3.8	15.18	9.65	2.57	-	0.89	-	-	0.32	-	-	0.23	-	-	0.19	-	0.27	0.23	0.21
21.1	19.9	58	-12	2.7	3.4	29.01	11.94	4.15	-	1.48	-	-	1.42	-	-	0.79	-	-	0.68	-	0.49	0.39	0.29
21.1	19.9	58	-12	2.7	3.4	34.63	19.53	15.99	-	6.92	-	-	5.07	-	-	3.12	-	-	1.28	-	0.27	0.27	0.17
18.4	17.4	60	-3	2.8	4.1	16.29	15.41	10.35	-	5.31	-	-	1.86	-	-	0.91	-	-	0.83	-	0.71	0.43	0.18
18.4	17.4	60	-3	2.8	4.1	27.18	24.02	17.14	-	7.38	-	-	2.49	-	-	0.90	-	-	0.47	-	0.27	0.24	0.16
20.3	18.9	-	28	2.1	2.8	20.96	19.84	9.65	-	3.95	-	-	1.87	-	-	1.69	-	-	1.07	-	0.54	0.34	0.22
20.3	18.9	-	28	2.1	2.8	27.81	21.73	12.97	-	5.51	-	-	2.31	-	-	4.02	-	-	1.39	-	0.66	0.39	0.22
26.7	25.8	-	-26	1.7	2.1	14.70	7.60	0.68	-	0.25	-	-	0.28	-	-	0.16	-	-	0.09	-	0.08	0.10	0.05
26.7	25.8	-	-26	1.7	2.1	22.33	14.69	2.62	-	0.19	-	-	0.14	-	-	0.12	-	-	0.13	-	0.10	0.06	0.10
20.4	20.2	87	28	3.3	4.7	25.55	17.97	5.81	-	2.62	-	-	2.44	-	-	2.84	-	-	3.18	-	1.72	1.20	0.82
20.4	20.2	87	28	3.3	4.7	15.56	15.67	6.62	-	4.12	-	-	2.96	-	-	2.82	-	-	1.85	-	1.90	1.40	0.72
20.1	20.1	88	28	3.3	4.7	9.10	3.59	1.83	-	2.68	-	-	1.64	-	-	1.20	-	-	0.83	-	0.72	0.65	0.43
20.1	20.1	88	28	3.3	4.7	6.70	1.43	1.41	-	1.66	-	-	0.93	-	-	0.88	-	-	1.13	-	0.53	0.51	0.36
24.0	22.9	61	-15	2.2	2.7	26.00	19.50	9.63	-	1.35	-	-	0.75	-	-	0.53	-	-	0.46	-	0.22	0.18	0.11
24.0	22.9	61	-15	2.2	2.7	23.06	15.74	5.38	-	0.75	-	-	0.28	-	-	0.28	-	-	0.28	-	0.20	0.17	0.10
22.9	22.5	61	-7	2.1	2.7	21.59	18.89	12.06	-	3.10	-	-	1.88	-	-	1.52	-	-	1.23	-	0.90	0.51	0.32
22.9	22.5	61	-7	2.1	2.7	19.47	14.82	4.60	-	1.70	-	-	1.53	-	-	0.96	-	-	0.72	-	0.50	0.30	0.29
-	21.3	80	-12	3.6	4.5	28.72	29.27	12.36	-	4.05	-	-	1.69	-	-	1.16	-	-	0.95	-	0.67	0.48	0.28
-	21.3	80	-12	3.6	4.5	16.73	12.93	3.48	-	1.79	-	-	1.72	-	-	2.02	-	-	1.35	-	0.74	0.61	0.34
23.7	22.8	71	-22	3.5	4.5	32.18	24.47	8.07	-	2.93	-	-	1.54	-	-	0.47	-	-	0.38	-	0.21	0.09	0.04
23.7	22.8	71	-22	3.5	4.5	36.42	23.88	9.15	-	1.31	-	-	1.18	-	-	0.49	-	-	0.37	-	0.25	0.11	0.10
24.7	23.7	38	16	2.9	3.7	68.52	56.08	49.66	-	22.94	-	-	7.74	-	-	3.74	-	-	2.62	-	1.18	0.92	0.73
24.7	23.7	38	16	2.9	3.7	43.48	34.20	20.30	-	7.93	-	-	5.46	-	-	4.74	-	-	3.28	-	1.42	0.64	0.46
26.9	25.4	40	19	2.4	3.0	47.05	41.18	21.99	-	2.71	-	-	0.69	-	-	0.66	-	-	0.51	-	0.30	0.19	0.12
26.9	25.4	40	19	2.4	3.0	22.92	30.50	17.87	-	5.54	-	-	3.36	-	-	1.79	-	-	1.25	-	0.61	0.38	0.21
22.7	21.9	48	11	1.5	2.0	30.66	10.87	3.26	-	1.11	-	-	2.25	-	-	0.76	-	-	0.78	-	0.52	0.23	0.10
22.7	21.9	48	11	1.5	2.0	41.14	32.48	11.62	-	4.90	-	-	2.51	-	-	1.49	-	-	1.01	-	0.39	0.24	0.13
21.3	19.9	62	9	1.8	2.5	23.45	22.80	11.76	3.03	3.03	3.03	2.59	2.40	2.21	1.77	1.83	1.88	1.90	1.88	1.86	0.92	0.51	0.36
21.3	19.9	62	9	1.8	2.5	16.32	28.01	14.08	7.83	7.04	6.25	3.42	2.90	2.38	1.59	1.37	1.16	0.99	0.95	0.91	0.47	0.59	0.24
22.3	19.6	73	29	1.8	2.4	31.75	14.48	4.31	0.79	0.79	0.79	1.42	1.53	1.64	1.18	1.18	1.17	0.92	0.91	0.91	0.58	0.22	0.12
22.3	19.6	73	29	1.8	2.4	16.76	21.87	10.11	5.43	4.01	2.59	3.36	2.84	2.33	1.82	1.25	0.69	0.91	1.06	1.21	0.45	0.41	0.22
25.6	24.8	56	-9	1.9	2.5	32.31	29.14	15.88	6.15	6.15	6.15	4.93	4.37	3.82	2.25	1.93	1.61	1.20	0.86	0.53	0.30	0.19	0.32
25.6	24.8	56	-9	1.9	2.5	16.52	21.13	15.42	2.78	2.44	2.10	1.63	1.54	1.46	1.10	1.11	1.13	0.89	0.74	0.60	0.97	0.65	0.39
23.1	22.5	65	25	2.5	3.3	25.53	22.60	11.00	3.39	3.39	3.39	1.89	1.87	1.85	1.24	1.16	1.08	0.65	0.65	0.65	0.38	0.30	0.25
23.1	22.5	65	25	2.5	3.3	14.94	22.45	11.88	4.71	3.89	3.07	1.73	1.51	1.29	1.01	0.91	0.82	0.97	0.83	0.68	0.60	0.45	0.32
21.2	20.8	60	-18	3.4	4.1	32.54	34.98	24.13	11.09	11.09	11.09	5.63	5.03	4.42	3.57	3.37	3.18	2.49	2.25	2.00	1.07	0.55	0.23
21.2	20.8	60	-18	3.4	4.1	26.45	28.84	17.50	12.19	9.25	6.31	3.76	3.48	3.21	1.80	1.57	1.34	1.47	1.36	1.26	0.78	0.36	0.28
22.6	22.1	58	-27	2.5	3.2	26.01	18.16	8.81	2.60	2.60	2.60	2.73	3.01	3.28	2.39	2.83	3.26	2.43	2.22	2.02	0.51	0.29	0.40
22.6	22.1	58	-27	2.5	3.2	5.66	10.99	15.90	14.93	8.98	3.03	3.68	2.82	1.97	1.48	1.52	1.55	1.49	1.37	1.25	1.74	1.14	0.56
22.3	21.2	51	-28	3.6	4.5	8.65	6.38	0.43	0.16	0.16	0.16	0.17	0.18	0.19	0.16	0.15	0.14	0.15	0.16	0.17	0.09	0.04	0.02
22.3	21.2	51	-28	3.6	4.5	9.31	5.51	0.90	0.18	0.17	0.16	0.20	0.17	0.14	0.15	0.18	0.21	0.18	0.20	0.22	0.23	0.05	0.03
22.9	21.7	44	-17	3.0	4.1	19.14	9.10	3.08	0.86	0.86	0.86	0.71	0.69	0.68	0.80	0.78	0.77	0.68	0.62	0.56	0.45	0.44	0.22
22.9	21.7	44	-17	3.0	4.1	17.85	10.66	4.05	2.76	2.51	2.26	1.73	1.49	1.25	1.06	0.94	0.83	0.87	0.81	0.76	0.45	0.36	0.29
20.9	20.1	59	12	3.5	4.5	25.85	23.97	10.88	3.42	3.42	3.42	2.67	2.34	2.01	1.44	1.41	1.37	1.25	1.43	1.61	1.12	0.80	0.47
20.9	20.1	59	12	3.5	4.5	43.17	31.00	24.14	13.07	9.19	5.30	2.60	2.06	1.52	1.01	1.05	1.09	1.06	1.09	1.12	0.57	0.67	0.48
20.6	19.9	53	11	2.8	3.5	19.24	26.58	13.33	2.37	2.37	2.37	1.89	1.81	1.74	1.49	1.42	1.35	1.16	1.22	1.28	0.81	0.65	0.28
20.6	19.9	53	11	2.8	3.5	14.74	12.34	6.37	4.43	3.48	2.54	2.04	1.87	1.71	1.22	1.16	1.10	0.97	0.86	0.75	0.67	0.45	0.33
18.7	17.2	-	11	2.1	2.6	17.59	8.17	0.81	0.52	0.52	0.52	0.45	0.37	0.30	0.32	0.32	0.31	0.21	0.20	0.20	0.15	0.08	0.14
18.7	17.2	-	11	2.1	2.6	7.06	4.38	1.22	0.59	0.60	0.41	0.42	0.37	0.33	0.24	0.24	0.23	0.16	0.17	0.18	0.15	0.12	0.06
18.7	17.2	-	10	2.1	2.6	25.70	12.17	4.21	1.83	1.83	1.83	1.68	1.33	0.98	0.97	0.87	0.78	0.78	0.84	0.90	0.54	0.21	0.13
18.7	17.2	-	10	2.1	2.6	25.29	16.47	5.79	4.44	3.22	2.01	1.34	1.34	1.34	0.95	0.82	0.69	0.55	0.53	0.50	0.55	0.40	0.19
25.3	22.8	-	25	2.2	3.2	16.69	8.65	2.34	1.71	1.71	1.71	1.21	1.20	1.20	0.93	0.83	0.72	0.64	0.66	0.68	0.38	0.33	0.23
25.3	22.8	-	25	2.2	3.2	12.52	7.14	1.98	1.40	1.41	1.41	1.19	1.03	0.87	0.99	0.78	0.57	0.53	0.52	0.51	0.44	0.30	0.22
25.4	22.8	-	25	2.3	3.1	24.99	17.96	7.94	3.57	3.57	3.57	2.53	2.19	1.84	1.35	1.09	0.84	0.96	0.96	0.96	0.60	0.35	0.23
25.4	22.8	-	25	2.3	3.1	18.09	12.66	6.90	2.45	2.27	2.09	1.39	1.39	1.37	1.19	0.96	0.74	0.76	0.66	0.56	0.38	0.47	0.21
-	-	-	-	-	-	11.67	15.71	8.82	2.15	2.15	2.15	1.47	1.34	1.21	1.08	1.20	1.32	1.19	1.03	0.88	0.65	0.22	0.30
-	-	-	-	-	-	15.89	22.66	8.21	3.90	2.50	1.10	1.30	1.28	1.25	0.76	0.66	0.57	0.68	0.69	0.69	0.49	0.44	0.33

'	'	'	'	'	'	18.81	15.20	11.74	3.51	3.51	3.51	3.00	2.53	2.06	1.40	1.35	1.31	1.12	1.29	1.47	0.43	0.62	0.31
-	-	-	-	-	-	13.48	22.86	14.26	5.34	4.49	3.64	3.38	3.27	3.15	3.72	3.29	2.86	2.49	2.40	2.30	1.74	1.37	0.60
19.0	18.8	71	0	2.4	3.2	24.66	24.93	21.20	3.93	3.93	3.93	2.44	2.11	1.78	1.36	1.26	1.16	1.22	1.27	1.32	0.72	0.44	0.30
19.0	18.8	71	0	2.4	3.2	22.30	20.90	13.36	10.40	8.17	5.93	4.04	3.63	3.21	2.26	2.30	2.35	1.80	1.79	1.79	1.05	0.86	0.45
19.0	18.6	71	-2	2.3	3.2	33.70	26.56	24.30	11.06	11.06	11.06	7.66	7.00	6.34	4.61	4.47	4.33	4.62	4.28	3.94	1.61	1.00	0.63
19.0	18.8	71	-2	2.3	3.2	27.48	20.70	13.32	8.72	6.35	3.97	4.07	3.76	3.44	3.48	2.83	2.19	1.67	1.58	1.48	1.30	1.35	0.72
21.7	20.9	66	19	2.7	3.3	30.41	22.65	11.40	1.94	1.94	1.94	1.35	1.18	1.01	0.93	0.91	0.89	0.87	0.83	0.79	0.53	0.41	0.16
21.7	20.9	66	19	2.7	3.3	23.63	13.64	6.03	1.45	1.32	1.18	0.94	0.87	0.80	0.87	0.80	0.72	0.59	0.53	0.48	0.46	0.25	0.15
21.9	21.0	66	23	2.4	3.1	33.75	25.96	15.30	2.21	2.21	2.21	1.81	1.72	1.62	1.24	1.21	1.19	1.04	1.00	0.96	0.63	0.60	0.35
21.9	21.0	66	23	2.4	3.1	22.66	16.38	10.38	6.50	5.30	4.09	2.54	2.16	1.77	1.94	-	1.67	1.68	1.45	1.23	0.88	0.47	0.51

Appendix III.

Presentations of the results of the questionnaire by participants of the Workshop Harmonisation of Drift



Drift Reduction Classes

Distance (m)	Field crops			Fruit crops			Grape vine			Hops		
	50%	75%	90%	50%	75%	90%	50%	75%	90%	50%	75%	90%
1	1,70	0,85	0,34									
3				12,99	6,49	2,60	3,39	1,70	0,68	10,04	5,02	2,01
5	0,35	0,18	0,07	9,37	4,69	1,87	1,71	0,86	0,34	7,11	3,56	1,42
10	0,18	0,09	0,04	6,02	3,01	1,20	0,68	0,34	0,14	3,82	1,91	0,76
15	0,12	0,06	0,02	2,94	1,47	0,59	0,40	0,20	0,08	1,69	0,85	0,34
20	0,09	0,05	0,02	1,44	0,72	0,29	0,27	0,13	0,05	0,95	0,47	0,19
30	0,06	0,03	0,01	0,53	0,26	0,11	0,16	0,08	0,03	0,42	0,21	0,08
40	0,05	0,02	0,01	0,26	0,13	0,05	0,11	0,05	0,02	0,24	0,12	0,05
50	0,04	0,02	0,01	0,15	0,07	0,03	0,08	0,04	0,02	0,15	0,08	0,03
75	0,02	0,01	0,00									
100	0,02	0,01	0,00									

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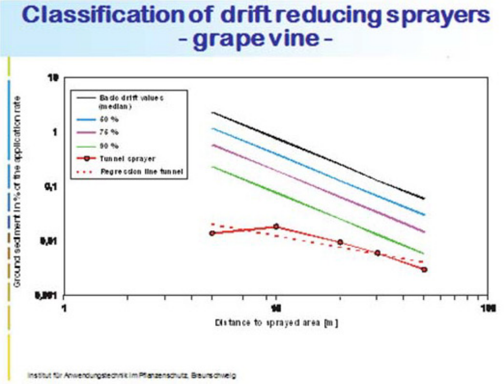

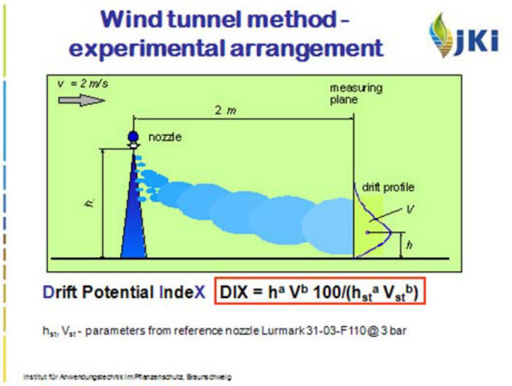

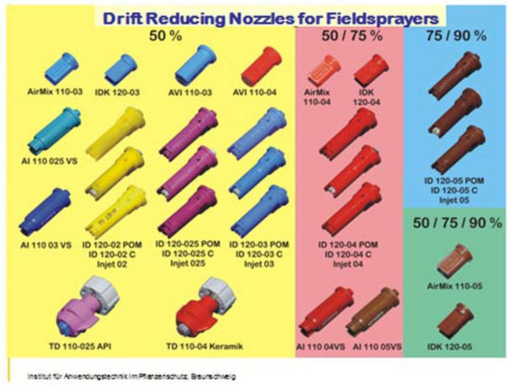

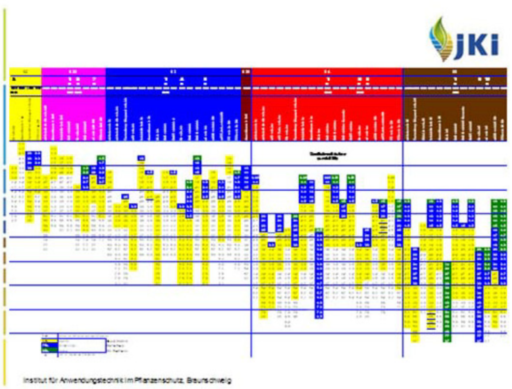

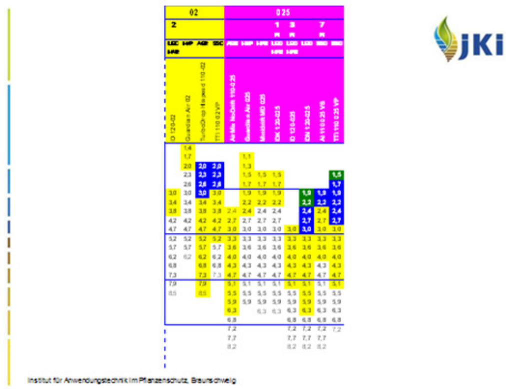

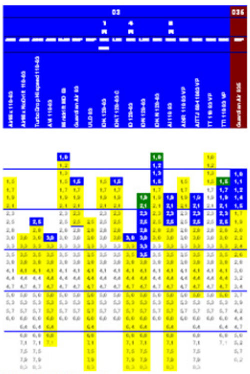

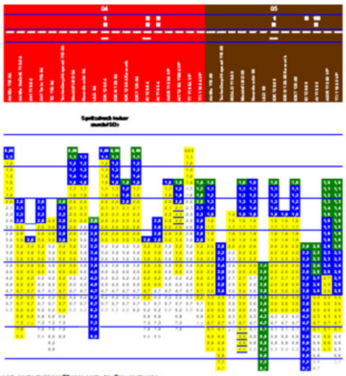

Loss reducing equipment
Field crops

Hardi TWIN FORCE (18 to 24 m)

50 %: with nozzle Hardi ISO-F 110-02 or Hardi ISO-F 110-03

Regulation of use :
Spray pressure max. 2.5 bar, fan drive at 140 bar, min. crop height 30 cm.

75 %: with nozzle Hardi ISO-F 110-04 or Hardi ISO-F 110-05

Regulation of use :
Spray pressure 3 bar, fan drive at maximum , min. crop height 50 cm.

Drift reduction 50 % class

Drift reduction 75 % class

Loss reducing equipment
Orchards

Air assisted sprayers

with nozzle
Agrotop TD 80-02 Keramik
Albuz AVI 80-015
Albuz AVI 80-02
Albuz AVI 80-03
Lechler ID 90-015 C
Lechler ID 90-02 C
Lechler ID 90-025 C
Lechler ID 90-03 C
Lechler AD 90-02 C; max. 4 bar
Lechler AD 90-03 C; max. 4 bar
Lechler AD 90-04 C
TeeJet DG 80 02 VS; max. 4 bar
TeeJet DG 80 03 VS; max. 4 bar
TeeJet DG 80 04 VS
TeeJet DG 80 05 VS

Drift reduction 50 % class

Regulation of use:
First 5 rows spraying without air towards field edge.
Sprayers to be adjusted according to the BBA - guideline.

Loss reducing equipment
Orchards

Wanner DA, NA, SZA

with SZA 32 or SZA 28 fan
with nozzle
Agrotop TD 80-02 Keramik
Albuz AVI 80-015
Albuz AVI 80-02
Albuz AVI 80-03
Lechler ID 90-015 C
Lechler ID 90-02 C
Lechler ID 90-025 C
Lechler ID 90-03 C
Lechler AD 90-02 C; max. 4 bar
Lechler AD 90-03 C; max. 4 bar
Lechler AD 90-04 C
TeeJet DG 80 02 VS; max. 4 bar
TeeJet DG 80 03 VS; max. 4 bar
TeeJet DG 80 04 VS
TeeJet DG 80 05 VS

Drift reduction 75 % class

Drift reduction 90 % class

Regulation of use:
First 3 rows (75 %) or 5 rows (90 %) spraying without air towards field edge.

Loss reducing equipment
Orchards

Holder NI und AS

with fan ...
... QU 13, QU 14, QU 15, QU 16, QU 20, QU 21 or OVS 50/60
with nozzle
Agrotop TD 80-02 Keramik
Albuz AVI 80-015
Albuz AVI 80-02
Albuz AVI 80-03
Lechler ID 90-015 C
Lechler ID 90-02 C
Lechler ID 90-025 C
Lechler ID 90-03 C
Lechler AD 90-02 C; max. 4 bar
Lechler AD 90-03 C; max. 4 bar
Lechler AD 90-04 C
TeeJet DG 80 02 VS; max. 4 bar
TeeJet DG 80 03 VS; max. 4 bar
TeeJet DG 80 04 VS
TeeJet DG 80 05 VS

Drift reduction 90 % class

Regulation of use:
First 5 rows
- with reduced air (sealing # 5) (QU 14, QU 15; hydr.)
- spraying without air towards field edge (QU 13 - QU 21 a. OVS 50/60)
- with reduced air (sealing # 4 towards field edge; sealing # 8 inwards) (QU 16; hydr.).

Loss reducing equipment
Orchards

John Deere 310 and 315

Drift reduction 75 % class

Sprayers with cross-flow fan
3 m working height
with nozzle
TeeJet DG 80 02 VS; max. 4 bar
TeeJet DG 80 03 VS; max. 4 bar
TeeJet DG 80 04 VS
TeeJet DG 80 05 VS
Lechler AD 90-02 C; max. 4 bar
Lechler AD 90-03 C; max. 4 bar
Lechler AD 90-04 C

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Loss reducing equipment
Orchards

LIPCO OSG-N

with nozzle
Agrotop TD 80-02 Keramik
Albuz AVI 80-015; max. 5 bar
Albuz AVI 80-02; max. 5 bar
Albuz AVI 80-03
Lechler ID 90-015 C; max. 5 bar
Lechler ID 90-02 C
Lechler ID 90-025 C
Lechler ID 90-03 C
Lechler AD 90-02 C; max. 3 bar
Lechler AD 90-03 C; max. 3 bar
Lechler AD 90-04 C; max. 4 bar
TeeJet DG 80 02 VS; max. 3 bar
TeeJet DG 80 03 VS; max. 3 bar
TeeJet DG 80 04 VS; max. 4 bar
TeeJet DG 80 05 VS

Drift reduction 90 % class

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Loss reducing equipment
Orchards and Vineyard

Wanner DA
Wanner SZA
Wanner DAL

Drift reduction 90 % class

or other air assisted sprayers

with „Kollektor-Recycling-System WKR"
Regulation of use:
max. tree height 2,20 m
max. row width 2,20 m

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Loss reducing equipment
Hops

NOBILI EURO V-105

Drift reduction 90 % class

WANNER N 42 A

Spraying in hops with one-side fan coverage and air induction nozzles
Regulation of use:
see operators manual

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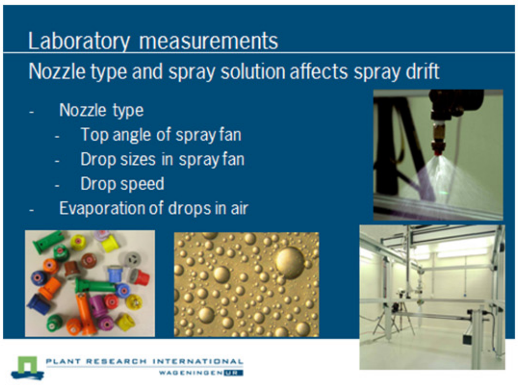
Conclusions

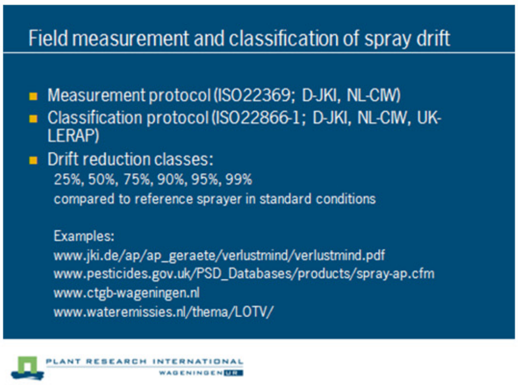
- List of drift reducing sprayers established as part of the german authorization procedure for ppp
- Field experiments still necessary to prove drift reduction
- Drift Potential IndeX from nozzles for classification if drift potential mainly depends on the nozzle

Thank You for Your Attention!

Dipl.-Ing. Dirk Rautmann

Section 2: Netherlands





Extended drift protocol (following ISO 22866)

- 2 measuring periods
  - < 1 May (dormant or early stages of foliage development)
  - > 1 May (fully developed canopy)
- Sprayed area of 20 meters
- At least 8 replicates per period
- Wind speed: 1 – 5 m/s
- Wind direction: max. 30° of perpendicular
- Temperature: 5 – 25 ° C
- Collectors: filter cloths (10 cm x 50 cm) or (10 cm x 100 cm)
- Measuring points (1,5 m; 3 – 10 m; 10 -15 m; 20m; 25m)
- Reference spraying machine (Munckhof cross-flow)

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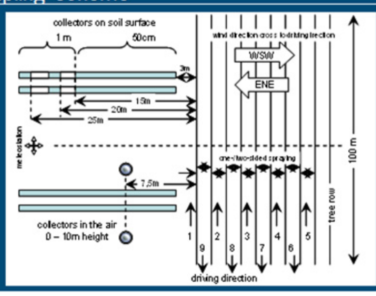
Sampling scheme



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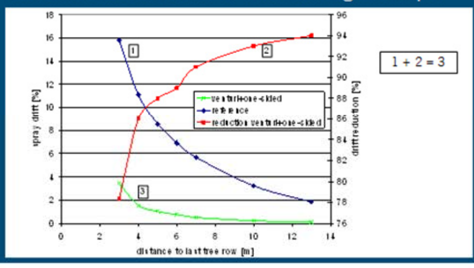
Calculation spray drift deposition based on reference and drift reduction curve of drift reducing technique



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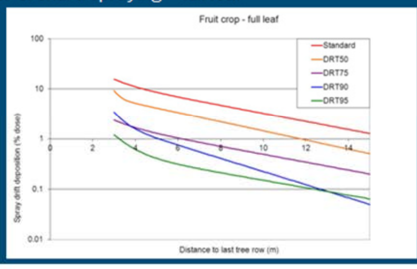
Reference spray drift and drift reduction class curves for orchard spraying – full leaf



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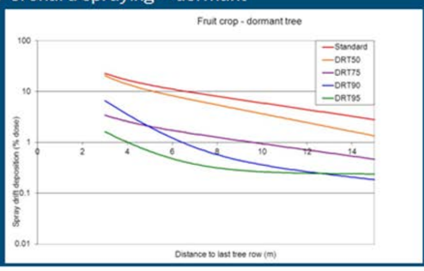
Reference spray drift and drift reduction class curves for orchard spraying – dormant



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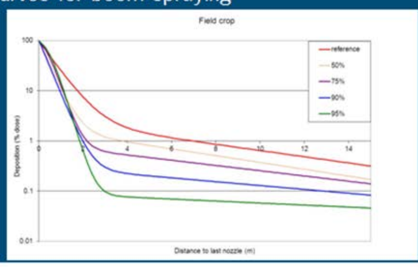
Reference spray drift and drift reduction class curves for boom spraying



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Classified drift reducing technology NL-arable

Drift reduction classes	Spray drift reducing technology in drift reduction class
50%	50% drift reducing nozzle types Air-assisted boom sprayer + nozzles drift reduction class 0 Low-boom height (30 cm) conventional boom sprayer + nozzles drift reduct class 0
75%	75% drift reducing nozzle types Band sprayer in maize + nozzles drift reduction class 0 Släpduk sprayer + nozzles drift reduction class 0 Hardi Twin Force air-assisted sprayer + nozzles drift reduction class 0

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Classified drift reducing technology NL-arable

Drift reduction classes	Spray drift reducing technology in drift reduction class
90%	90% drift reducing nozzle types Band sprayer in sugar beet + nozzles drift reduction class 0 Low-boom height (30 cm) conventional boom sprayer + nozzles drift reduct. class 50 Air-assisted boom sprayer + nozzles drift reduction class 50
95%	95% drift reducing nozzle types Low-boom height (30 cm) air-assisted boom sprayer + nozzles drift reduction class 0 Low-boom height (30 cm) air-assisted boom sprayer + nozzles drift reduct. class 50 Hardi Twin Force air-assisted sprayer + nozzles drift reduction class 50 Släpduk sprayer + nozzles drift reduction class 50 Tunnel sprayer for bed-grown crops + nozzles drift reduction class 0

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Classified drift reducing technology NL- orchard

Drift reduction classes	Spray drift reducing technology in drift reduction class
50%	50% drift reducing nozzle types sensor sprayer + standard nozzles; reflection shield sprayer + standard nozzles; Wanner cross-flow +reflection shield + standard nozzles;
75%	75% drift reducing nozzle types tunnel sprayer + standard nozzles;
90%	90% drift reducing nozzle types cross-flow + venturi nozzles + one-sided outside row; axial fan sprayer + venturi nozzles + one-sided outside row;
95%	95% drift reducing nozzle types Wanner cross-flow +reflection shield + venturi nozzles;

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Thank you for your attention !

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Session 2: Germany

Risk Mitigation measures in the authorisation procedure in Germany related to spray-drift

Spray-drift workshop – Session 2

Martin Streloke

Federal Office of Consumer Protection and Food Safety (BVL), Braunschweig, Germany

General items

- German Plant Protection Act is legal base so far,
- Buffer zones to protect non-target life are mentioned therein,
- Farmers are obliged to follow the restrictions,
- Otherwise penalties might be set,
- Farmers must be able to understand restrictions,
- Restrictions must be enforcable,
- State authorities are responsible for enforcing restrictions.

General items

- Very close connection to risk assessment,
- Usually exposure reduction,
- Setting of risk mitigation measures is a precondition for getting products and uses authorised,
- Here only very often used mitigation measures are presented – much more in use (e.g. ground water, B&M),
- Discussion on changes needed due to 1107/2009/EC (S-phrases of old annex V) underway.

Aquatic Organisms - Standard Use Situation

- FOCUS spray drift values,
- Conventional application technique,
- 30 cm deep waterbody,
- Stagnant isolated waterbody,
- No exposure reducing structures like vegetation between application area and waterbody,
- Complete population is exposed to same PEC,
- Additional measures to mitigate runoff, drainage, volatilisation, but also point sources, application rate, number of applications in use.

Label Phrase – Aquatic Organisms

NW 605*: When applying the product on areas adjacent to surface waters - except only occasionally but including periodically water bearing surface waters - the product must be applied with equipment which is registered in the index of 'Loss Reducing Equipment' of 14 October 1993 ('Bundesanzeiger' [Federal Gazette] No 205, p. 9780) as amended. Depending on the drift reduction classes for the equipment stated below, the following buffer zones must be kept from surface waters. In addition to the minimum buffer zone provided for by state law, § 6 (2) 2nd sentence of the 'PflSchG' (German Plant Protection Act) must be observed for the drift reduction classes marked with "*".* ***(90 %: *, 75 %: *, 50 %: 10 m)***

NW 606*: The only case in which the product may be applied without loss reducing equipment is when at least the buffer zone stated below is kept from surface waters - except only occasionally but including periodically water bearing surface waters. Violations may be punished by fines of up to 50 000 Euro.* **15 m**

Terrestrial Life - Invertebrates and Plants

- Approaches for invertebrates and plants in off-crop area,
- FOCUS- spray drift values, standard application technique,
- Correction factor of 5 for unrealistic exposure in effect test,
- TER-approach,
- Agricultural land, streets, industrial plants, pathways etc. are not relevant,
- Drift reducing technique must be used in an area of 20 m adjacent to the edge of field if risk is expected.

Terrestrial Life - Invertebrates and Plants

- In case of predicted risk machinery reducing spray drift by 50, 75 or 90 % compared with the standard technique must be used and/or buffer zone of 5 m,
- The use of drift reducing technique and buffer zone is not necessary if:
  - ➢ knapsack sprayers are used or
  - ➢ the adjacent non-target area is smaller than 3 m,
- A buffer zone alone must not be kept if:
  - ➢ a sufficient amount of natural/semi-natural areas(habitats) are present in agricultural landscape of a village,
  - ➢ habitats like hedgerows are planted at former fields.

Label Phrase – Terrestrial Organisms

NT 108*: A buffer zone of at least 5 m must be kept from adjacent areas (except agriculturally or horticulturally used areas, roads, paths and public places). In addition, in an adjoining strip of at least 20 m, the product must be applied using loss reducing equipment which is registered in the index of 'Loss Reducing Equipment' of 14 October 1993 (Federal Gazette No 205, p. 9780) as amended, and be registered in at least drift reducing class 75 %. Neither loss reducing equipment nor a buffer zone of at least 5 m are required if the product is applied with portable plant protection equipment or if adjacent areas (field boundaries, hedges, groups of woody plants) are less than 3 m wide. A buffer zone of at least 5 m is also unnecessary if the product is applied in an area which has been declared by the Biologische Bundesanstalt in the "Index of regional proportions of ecotones" of 7 February 2002 (Federal Gazette no. 70 a of 13 April 2002), as amended, as agrarian landscape with a sufficient proportion of natural and semi-natural structures, or if evidence can be shown that adjacent areas (e.g. field boundaries, hedges, groups of woody plants) were planted on agriculturally or horticulturally used areas.*

Session 4: Netherlands

Harmonisation of drift

Jan van de Zande

Workshop, Wageningen, 1-2 December 2010

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Session 4: Discussion and final conclusions

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Suggested matrix evaluation structure for PPP authorisation, which combination yes/no approved

Technology /Crop-free buffer zone (m)	0.25	0.50	0.75	1.00	1.25	1.50	1.75	→
standard								
DRT50								
DRT75								
DRT90								
DRT95								

Drift deposition decreases from top left to right down

Combination not authorised

Combination authorised;

plus all combinations of same column and columns to the right

plus the entire row to the right and the columns below

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Suggested matrix evaluation structure for PPP authorisation, which combination yes/no approved

example orchards

Technology /Crop-free buffer zone (m)	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	→
standard									
DRT50									
DRT75									
DRT90									
DRT95									

Combination not authorised

Combination authorised

Combination not authorised, based on other legislation

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Harmonisation of the methodology for drift en drift reducing measures at a zonal level

- **Approach**
  1. Identification of the drift data with differentiation to crops (arable, fruit orchards)
  2. Identification of main driving factors for drift deposition to surface water or non target zones
  3. Identification of the most important measures to reduce drift
  4. Quantification of the main driving factors, reference drift data
  5. Development of methodology to assess/implement drift reducing measures (drift classes of different measures)

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Harmonisation of the methodology for drift en drift reducing measures at a zonal level

- **Workshop**
  - At 1-2 December 2010 a workshop will be organised in Wageningen, The Netherlands.
  - In this workshop the objectives and approach will be addressed.
  - For this workshop representatives of the Member States will be invited.
  - The focus will be on representatives from research and assessment agencies.

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Thank you for your attention !

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