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APPENDIX A

Contents: abbreviated analysis of variance (ANOVA) tables

Table 1A Analysis of variance of total dry mass (roots + shoots) of maize seedlings exposed to atrazine in aqueous medium in the NPK-experiment (Table 4, Chapter 2)

	Total dry mass			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	7	23.50	18.00	0.0001
Atrazine (A)	2	179.01	137.07	0.0001
Ntr x A	14	17.64	13.51	0.0001
Error	72	1.30		
Total	95			
C.V. (%)		25		
R^2		0.89		

Table 2A Analysis of variance of percent damage to maize seedlings exposed to atrazine in aqueous medium in the NPK-experiment (Table 4, Chapter 2)

	Total dry mass			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	7	1836.6	9.06	0.0001
Atrazine (A)	1	6506.7	32.09	0.0001
Ntr x A	7	264.9	1.31	0.2698
Error	48	185.9		
Total	63			
C.V. (%)		30		
R^2		0.70		

Table 3A Analysis of variance of leaf diffusive resistance of maize seedlings exposed to atrazine in aqueous medium in the NPK-experiment (Table 5, Chapter 2)

	Leaf diffusive resistance			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	7	2.98	3.09	0.0066
Atrazine (A)	2	103.29	106.92	0.0001
Ntr x A	14	0.49	0.51	0.9196
Error	72	0.96		
Total	95			
C.V. (%)		12		
R^2		0.77		

Table 4A Analysis of variance of percent atrazine remaining 0, 14 and 28 days after application of the herbicide in aqueous medium in the NPK-experiment (Figure 1, Chapter 2)

	Percent atrazine remaining in solution			
Source	DF	MS	F value	PR > F
Time (T)	2	33645.9	749.29	0.0001
Nutrient (Ntr)	7	270.1	6.02	0.0001
Atrazine (A)	1	12.3	0.28	0.6024
T x Ntr	14	159.8	3.56	0.0005
T x A	2	32.2	0.72	0.4924
Ntr x A	7	123.3	2.75	0.0176
T x Ntr x A	14	69.1	1.54	0.1334
Error	48	44.9		
Total	95			
C.V. (%)		9		
R^2		0.97		

Table 5A Analysis of variance of total dry mass of maize seedlings exposed to atrazine in aqueous medium in the CaMg-experiment (Table 6, Chapter 2)

	Total dry mass			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	3	10.05	3.86	0.0149
Atrazine (A)	2	168.49	64.71	0.0001
Ntr x A	6	15.06	5.79	0.0001
Error	48	2.60		
Total	59			
C.V. (%)		29		
R^2		0.78		

Table 6A Analysis of variance of percent damage to maize seedlings exposed to atrazine in aqueous medium in the CaMg-experiment (Table 6, Chapter 2)

	Total dry mass			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	3	3709.7	10.44	0.0001
Atrazine (A)	1	8342.3	23.47	0.0001
Ntr x A	3	476.0	1.34	0.2789
Error	32	355.4		
Total	39			
C.V. (%)		39		
R^2		0.64		

Table 7A Analysis of variance of leaf diffusive resistance of maize seedlings exposed to atrazine in aqueous medium in the CaMg-experiment (Table 7, Chapter 2)

	Leaf diffusive resistance			
Source	DF	MS	F value	PR > F
Nutrient (Ntr)	3	6.01	0.95	0.4269
Atrazine (A)	2	101.56	16.04	0.0001
Ntr x A	6	10.33	1.63	0.1666
Error	36	6.33		
Total	47			
C.V. (%)		32		
R^2		0.55		

Table 8A Analysis of variance of percent atrazine remaining 0, 14 and 28 days after application in aqueous medium in the CaMg-experiment (Figure 2, Chapter 2)

	Percent atrazine remaining in solution			
Source	DF	MS	F value	PR > F
Time (T)	2	31432.5	615.6	0.0001
Nutrient (Ntr)	3	482.2	9.45	0.0001
Atrazine (A)	1	402.9	7.89	0.0072
T x Ntr	6	128.3	2.51	0.0339
T x A	2	101.9	2.00	0.1469
Ntr x A	3	19.6	0.38	0.7649
T x Ntr x A	6	5.2	0.10	0.9958
Error	48	51.1		
Total	71			
C.V. (%)		12		
R^2		0.96		

Table 9A Analysis of variance of total dry mass (roots + shoots) of maize seedlings exposed to different P-levels and atrazine in aqueous medium (Table 9, Chapter 2)

	Dry mass (g $plant^{-1}$)			
Source	DF	MS	F value	PR > F
Phosphorus (P)	5	0.12	1.73	0.1360
Atrazine (A)	2	75.97	1070.45	0.0001
P x A	10	0.09	1.35	0.2161
Error	90	0.07		
Total	107			
C.V. (%)		14		
R^2		0.96		

Table 10A Analysis of variance of leaf diffusive resistance of maize seedlings exposed to different P-levels and atrazine in aqueous medium (Table 9, Chapter 2)

	Leaf diffusive resistance (s cm^{-1})			
Source	DF	MS	F value	PR > F
Phosphorus (P)	5	258.1	7.88	0.0001
Atrazine (A)	2	6177.3	188.57	0.0001
P x A	10	75.9	2.32	0.0177
Error	90	32.7		
Total	107			
C.V. (%)		26		
R^2		0.83		

Table 11A Analysis of variance of total dry mass (roots + shoots) of maize seedlings exposed to atrazine in nutrient solutions containing different combinations of P and NH_4^+:NO_3^- -N ratios (Table 10, Chapter 2)

	Dry mass (g plant^{-1})			
Source	DF	MS	F value	PR > F
P/NH_4^+:NO_3^- (Ntr)	4	2.05	85.12	0.0001
Atrazine (A)	2	4.77	197.91	0.0001
Ntr x A	8	0.09	3.57	0.0011
Error	105	0.02		
Total	119			
C.V. (%)		12		
R^2		0.87		

Table 12A Analysis of variance of photosynthetic CO_2 fixation tempo of maize seedlings exposed to atrazine in nutrient solutions containing different combinations of P and NH_4^+:NO_3^- -N ratios (Table 11, Chapter 2)

	CO_2-fixation tempo (mg m^{-2} s^{-1})			
Source	DF	MS	F value	PR > F
P/NH_4^+:NO_3^- (Ntr)	4	0.120	3.45	0.0154
Atrazine (A)	2	3.954	113.78	0.0001
Ntr x A	8	0.095	2.72	0.0154
Error	45	0.035		
Total	59			
C.V. (%)		19		
R^2		0.85		

Table 13A Analysis of variance of percent P in shoots of maize seedlings exposed to atrazine in solutions containing different combinations of P and $NH_4^+:NO_3^-$ -N ratios (Table 10, Chapter 2)

	Percentage P in shoots			
Source	DF	MS	F value	PR > F
$P/NH_4^+:NO_3^-$ (Ntr)	4	0.991	62.23	0.0001
Atrazine (A)	2	0.898	56.39	0.0001
Ntr x A	8	0.034	2.13	0.0981
Error	15	0.016		
Total	29			
C.V. (%)		11		
R^2		0.96		

Table 14A Analysis of variance of grain yield of maize exposed to different fertilizer (3:2:1 25%) and atrazine rates in the field (Table 13, Chapter 2)

	Grain yield (ton ha^{-1})			
Source	DF	MS	F value	PR > F
Replicate (R)	2	1.05	0.54	0.3675
Fertilizer (F)	4	2.22	1.62	0.2607
Atrazine (A)	6	3.24	9.59	0.0005
F x A	24	0.36	1.65	0.0692
Error a (A x R)	12	0.34		
Error b (F x R)	8	1.37		
Error c (A x F x R)	48	0.22		
Total	104			
C.V.(%) Main plots		31		
C.V.(%) Sub-plots		18		
R^2		0.71		

Table 15A Analysis of variance[1] of percent reduction in growth caused by atrazine to dry beans and sunflower in a glasshouse (Table 15, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	26	0.5	0.5888
Crop (C)	1	50577	1049.7	0.0001
Soil (S)	8	38410	797.2	0.0001
Atrazine (A)	9	19770	410.3	0.0001
C x S	8	2133	44.3	0.0001
C x A	9	673	13.9	0.0001
S x A	72	1067	22.2	0.0001
C x S x A	72	318	6.6	0.0001
Error	355	49		
Total[2]	536			
C.V. (%)		20		
R^2		0.97		

[1]ANOVA conducted on data from Experiment I.
[2]Number of missing values = 3 (unsatisfactory emergence at three separate treatment combinations).

Table 16A Analysis of variance[1] of percent reduction in growth caused by atrazine to oats and soybeans in a glasshouse (Table 16, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	39	1.4	0.2546
Crop (C)	1	68431	2394.2	0.0001
Soil (S)	8	13178	461.1	0.0001
Atrazine (A)	9	18518	647.9	0.0001
C x S	8	438	15.3	0.0001
C x A	9	620	21.7	0.0001
S x A	72	346	12.1	0.0001
C x S x A	72	588	20.6	0.0001
Error	356	29		
Total[2]	537			
C.V. (%)		11		
R^2		0.97		

[1]ANOVA conducted on data from Experiment I.
[2]Number of missing values = 2 (unsatisfactory emergence at two separate treatment combinations).

Table 17A Dry beans alone: analysis of variance of percent growth reduction caused by atrazine (Table 17, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	45	0.85	0.4281
Soil (S)	8	14752	278.40	0.0001
Atrazine (A)	9	7041	132.87	0.0001
S x A	72	723	13.65	0.0001
Error	174	53		
Total[1]	265			
C.V. (%)		29		
R^2		0.96		

[1]Four missing values were recorded due to unsatisfactory emergence at four separate treatment combinations.

Table 18A Oats alone: analysis of variance of percent reduction in growth caused by atrazine (Table 18, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	73	2.45	0.0886
Soil (S)	9	16569	554.71	0.0001
Atrazine (A)	9	11312	378.72	0.0001
S x A	81	527	17.65	0.0001
Error	198	30		
Total	299			
C.V. (%)		10		
R^2		0.98		

Table 19A Soybeans alone: analysis of variance of percent reduction in growth caused by atrazine (Table 19, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	23	0.81	0.4484
Soil (S)	8	6720	234.46	0.0001
Atrazine (A)	9	7230	252.25	0.0001
S x A	72	445	15.52	0.0001
Error	176	28		
Total[1]	267			
C.V. (%)		15		
R^2		0.97		

[1]Two missing values were recorded due to unsatisfactory emergence at two separate treatment combinations.

Table 20A Sunflower alone: analysis of variance of percent reduction in growth caused by atrazine (Table 20, Chapter 3)

	Percent reduction in seed yield			
Source	DF	MS	F value	PR > F
Replicate	2	89	2.32	0.1010
Soil (S)	9	24275	627.54	0.0001
Atrazine (A)	9	16056	415.06	0.0001
S x A	81	682	17.65	0.0001
Error	192	53		
Total[1]	293			
C.V. (%)		13		
R^2		0.98		

[1]Six missing values were recorded because of unsatisfactory emergence at six separate treatment combinations.

Table 21A Analysis of variance of percent reduction in growth caused by atrazine to grain sorghum (Table 21, Chapter 3)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	2	24	0.90	0.4104
Soil (S)	8	6981	260.25	0.0001
Atrazine (A)	8	13345	497.45	0.0001
S x A	64	338	12.63	0.0001
Error	160	26		
Total	242			
C.V. (%)		13		
R^2		0.97		

Table 22A Analysis of variance of percent reduction in growth caused by atrazine to the test plant oats, 35 days after herbicide application (Figure 3, Chapter 4; data given in Table 2B)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	4	101.3	0.87	0.4852
Locality (L)	9	6450.4	55.16	0.0001
Atrazine (A)	4	45356.8	387.89	0.0001
L x A	36	570.3	4.88	0.0001
Error	181	116.9		
Total[1]	234			
C.V. (%)		22		
R^2		0.92		

[1]Two replicates at locality no.8, and one at locality no. 10 were discarded due to unsatisfactory plant stand.

Table 23A Analysis of variance of percent reduction in growth caused by atrazine/atrazine residues to the test plant oats, 182 days after herbicide application (Figure 4, Chapter 5; data given in Table 3B)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	4	840.5	2.77	0.0301
Locality (L)	6	2852.4	9.40	0.0001
Atrazine (A)	4	12972.3	42.84	0.0001
L x A	24	936.7	3.09	0.0001
Error	125	303.4		
Total[1]	163			
C.V. (%)		74		
R^2		0.71		

[1]Two replicates were discarded at locality no. 4 due to unsatisfactory plant stand. In addition, one missing value was recorded.

Table 24A Analysis of variance of percent reduction in growth caused by atrazine/atrazine residues to the test plant oats, 365 days after herbicide application (Figure 5, Chapter 5; data given in Table 4B)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Replicate	4	2372.5	4.62	0.0016
Locality (L)	6	2401.7	4.68	0.0002
Atrazine (A)	4	527.6	1.03	0.3957
L x A	24	279.7	0.54	0.9572
Error	126	513.4		
Total[1]	164			
C.V. (%)		50		
R^2		0.33		

[1]Ten missing values were recorded because data from one replicate at each of the no. 4 and no. 6 localities were discarded due to unsatisfactory plant stand.

Table 25A Analysis of variance of percent reduction in sunflower yield caused by residues of the recommended rates of atrazine applied 12 months previously (Table 27, Chapter 6)

	Percentage yield reduction			
Source	DF	MS	F value	PR > F
Replicate	4	14	0.6	0.6360
Soil	6	396	18.2	0.0001
Error	24	22		
Total	34			
C.V. (%)		40		
R^2		0.82		

Table 26A Analysis of variance of percent reduction in sunflower yield caused by residues of the recommended rates of atrazine applied 24 months previously (Table 28, Chapter 6)

	Percentage yield reduction			
Source	DF	MS	F value	PR > F
Replicate	4	4	0.7	0.6083
Soil	5	676	116.1	0.0001
Error	20	6		
Total	29			
C.V. (%)		45		
R^2		0.96		

Table 27A Analysis of variance of percent reduction in seed yield of dry beans caused by residues of all atrazine rates applied 12 months previously (Data appear in Table 5B)

	Percent reduction in seed yield			
Source	DF	MS	F value	PR > F
Replicate	4	22.99	1.48	0.2089
Locality (L)	7	543.01	35.04	0.0001
Atrazine (A)	5	174.48	11.26	0.0001
L x A	35	33.11	2.14	0.0007
Error	182	15.49		
Total[1]	233			
C.V. (%)		78		
R^2		0.68		

[1]Six missing values were recorded - five of which were due to only four replicates being used at Kroonstad as a result of flooding in that part of the trial at one stage.

Table 28A Analysis of variance of percent reduction in plant stand of dry beans caused by residues of all atrazine rates applied 12 months previously (Data appear in Table 6B)

	Percent reduction in stand			
Source	DF	MS	F value	PR > F
Replicate	4	27.38	3.16	0.0154
Locality (L)	7	17.77	2.05	0.0512
Atrazine (A)	5	10.72	1.24	0.2936
L x A	35	5.74	0.66	0.9251
Error	182	15.49		
Total[1]	233			
C.V. (%)		192		
R^2		0.23		

[1]Six missing values were recorded (see footnote Table 27A).

Table 29A Analysis of variance of percent reduction in seed yield of sunflower caused by residues of all atrazine rates applied 12 months previously (Data appear in Table 7B)

	Percent reduction in seed yield			
Source	DF	MS	F value	PR > F
Replicate	4	30.1	1.31	0.2703
Locality (L)	6	2629.4	114.15	0.0001
Atrazine (A)	5	742.8	11.26	0.0001
L x A	30	42.9	1.86	0.0077
Error	162	23.0		
Total[1]	207			
C.V. (%)		38		
R^2		0.85		

[1]Two missing values were recorded as a result of unsatisfactory plant emergence in two plots.

Table 30A Analysis of variance of percent reduction in plant stand of sunflower caused by residues of all atrazine rates applied 12 months previously (Data appear in Table 8B)

	Percent reduction in stand			
Source	DF	MS	F value	PR > F
Replicate	4	29.58	1.04	0.3858
Locality (L)	6	1 071.20	37.84	0.0001
Atrazine (A)	5	254.99	9.01	0.0001
L x A	30	40.79	1.44	0.0788
Error	162	28.31		
Total[1]	207			
C.V. (%)		86		
R^2		0.66		

[1]Two missing values were recorded as a result of unsatisfactory emergence.

Table 31A Analysis of variance of percent reduction in seed yield and plant stand of dry beans caused by residues of atrazine that was applied 24 months previously at Warmbad (Data appear in Table 9B)

	Seed yield			
Source	DF	MS	F value	PR > F
Replicate	4	8.33	0.63	0.6494
Atrazine	5	621.63	46.91	0.0001
Error	15	13.25		
Total[1]	24			
C.V. (%)		10		
R^2		0.98		
	Plant stand			
Source	DF	MS	F value	PR > F
Replicate	4	115.27	1.58	0.2283
Atrazine	5	1296.14	17.74	0.0001
Error	16	73.07		
Total[2]	25			
C.V. (%)		38		
R^2		0.88		

[1]Five missing values recorded for yield data as a result of flooding across replicates on one side of the trial.
[2]Four missing values recorded because plants in only one of the plots mentioned above could still be counted.

Table 32A Analysis of variance of percent reduction in seed yield and plant stand of sunflower caused by residues of atrazine that was applied 24 months previously (Data for yield and stand are given in Table 10B and Table 11B, respectively)

	Seed yield			
Source	DF	MS	F value	PR > F
Replicate	4	6.6	1.7	0.1535
Locality (L)	5	4933.0	1277.6	0.0001
Atrazine (A)	5	30.3	7.8	0.0001
L x A	25	31.0	8.0	0.0001
Error	136	3.9		
Total[1]	175			
C.V. (%)		36		
R^2		0.98		
	Plant stand			
Source	DF	MS	F value	PR > F
Replicate	4	80.6	2.79	0.0288
Locality (L)	5	91.9	3.18	0.0095
Atrazine (A)	5	83.0	2.88	0.0168
L x A	25	21.7	0.75	0.7931
Error	137	28.9		
Total[2]	176			
C.V. (%)		25		
R^2		0.31		

[1]Four missing values were recorded - three as a result of unsatisfactory emergence and one due to bird damage.
[2]Three missing values were recorded.

Table 33A Analysis of variance of percent atrazine remaining in two soils 30 days after incubation under different soil water and temperature levels (Table 29, Chapter 7)

	Percent atrazine in soil 30 d.a.t.			
Source	DF	MS	F value	PR > F
Soil (S)	1	4712.6	492.28	0.0001
Soil water (W)	2	1352.1	141.24	0.0001
Temperature (T)	2	205.2	21.44	0.0001
Atrazine (A)	1	9.0	0.94	0.3379
S x W	2	33.3	3.47	0.0417
S x T	2	100.5	10.49	0.0003
S x A	1	77.1	8.05	0.0074
W x T	4	86.3	9.01	0.0001
A x W	2	33.3	3.47	0.0417
A x T	2	3.4	0.36	0.7030
S x W x T	4	15.1	1.58	0.2010
S x W x A	2	91.9	9.60	0.0005
S x T x A	2	26.9	2.81	0.0735
S x W x T x A	8	15.5	1.62	0.1546
Error	36	9.6		
Total	71			
C.V. (%)			3	
R^2			0.96	

Table 34A Analysis of variance of percent atrazine remaining in two soils 60 days after incubation under different soil water and temperature levels (Table 30, Chapter 7)

	Percent atrazine in soil 60 d.a.t.			
Source	DF	MS	F value	PR > F
Soil (S)	1	4736.8	569.38	0.0001
Soil water (W)	2	6381.4	767.04	0.0001
Temperature (T)	2	650.3	78.16	0.0001
Atrazine (A)	1	147.3	17.71	0.0002
S x W	2	443.1	53.26	0.0001
S x T	2	234.4	28.17	0.0001
S x A	1	98.0	11.78	0.0015
W x T	4	101.1	12.16	0.0001
A x W	2	15.2	1.83	0.1753
A x T	2	2.4	0.28	0.7558
S x W x T	4	21.1	2.54	0.0568
S x W x A	2	73.8	8.87	0.0007
S x T x A	2	4.5	0.54	0.5869
S x W x T x A	8	11.1	1.33	0.2605
Error	36	8.3		
Total	71			
C.V. (%)		4		
R^2		0.98		

Table 35A Analysis of variance of amount of atrazine remaining in two soils 30 days after incubation under different soil water and temperature levels (Data given in Table 19B)

	Atrazine remaining in soil 30 d.a.t.			
Source	DF	MS	F value	PR > F
Soil (S)	1	1.1526	666.60	0.0001
Soil water (W)	2	0.3363	194.49	0.0001
Temperature (T)	2	0.0458	26.47	0.0001
Atrazine (A)	1	13.860	8015.49	0.0001
S x W	2	0.1821	105.29	0.0001
S x T	2	0.0311	17.97	0.0001
S x A	1	0.2255	130.45	0.0001
W x T	4	0.0173	9.98	0.0001
A x W	2	0.0725	41.95	0.0001
A x T	2	0.0054	3.13	0.0560
S x W x T	4	0.0048	2.76	0.0425
S x W x A	2	0.0717	41.48	0.0001
S x T x A	2	0.0164	9.46	0.0005
S x W x T x A	8	0.0040	2.30	0.0423
Error	36	0.0017		
Total	71			
C.V. (%)		3		
R^2		0.99		

Table 36A Analysis of variance of amount of atrazine remaining in two soils 60 days after incubation under different soil water and temperature levels (Data appear in Table 20B)

	Atrazine remaining in soil 60 d.a.t.			
Source	DF	MS	F value	PR > F
Soil (S)	1	1.1704	774.56	0.0001
Soil water (W)	2	1.4603	966.39	0.0001
Temperature (T)	2	0.1421	94.06	0.0001
Atrazine (A)	1	11.3129	7486.50	0.0001
S x W	2	0.1286	85.09	0.0001
S x T	2	0.0486	32.17	0.0001
S x A	1	0.2426	160.59	0.0001
W x T	4	0.0219	14.46	0.0001
A x W	2	0.1871	123.81	0.0001
A x T	2	0.0126	8.31	0.0011
S x W x T	4	0.0036	2.35	0.0724
S x W x A	2	0.0547	36.21	0.0001
S x T x A	2	0.0026	1.74	0.1893
S x W x T x A	8	0.0027	1.78	0.1128
Error	36	0.0015		
Total	71			
C.V. (%)		3		
R^2		0.99		

Table 37A Analysis of variance of fresh and dry mass of test plants seeded in the field at various stages after atrazine application (Table 31, Chapter 8)

	Fresh mass of top growth			
Source	DF	MS	F value	PR > F
Day	5	5086.6	199.73	0.0001
Error	12	25.5		
Total	17			
C.V. (%)		10		
R^2		0.98		
	Dry mass of top growth			
Source	DF	MS	F value	PR > F
Day	5	5040.9	260.54	0.0001
Error	12	19.4		
Total	17			
C.V. (%)		9		
R^2		0.99		

Table 38A Analysis of variance of percent reduction in top growth dry mass caused by atrazine to oats in soil samples taken from different soil layers at 1, 30, 60, 90 and 120 days after herbicide application (Table 32, Chapter 8)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
Day (D)	4	6133.2	322.01	0.0001
Layer (L)	3	422.1	22.16	0.0001
D x L	6[1]	470.4	24.70	0.0001
Error	36	19.0		
Total	49			
C.V. (%)		14		
R^2		0.98		

[1]Data for six treatment combinations (day 1/100-200 mm; day 1/200-300 mm; day 1/300-400 mm; day 30/300-400 mm; day 60/300-400 mm; day 90/300-400 mm) were not available for analysis because only certain soil layers were monitored at specific intervals.

Table 39A Analysis of variance of the estimated concentration of atrazine in soil samples taken from different soil layers 1, 30, 60, 90 and 120 days after herbicide application in the field (Table 32, Chapter 8)

	Estimated atrazine concentration			
Source	DF	MS	F value	PR > F
Day (D)	4	0.0219	229.81	0.0001
Layer (L)	3	0.0005	5.65	0.0028
D x L	6[1]	0.0009	9.26	0.9196
Error	36	0.0001		
Total	49			
C.V. (%)		29		
R^2		0.97		

[1]Data for six treatment combinations (day 1/100-200 mm; day 1/200-300 mm; day 1/300-400 mm; day 30/300-400 mm; day 60/300-400 mm; day 90/300-400 mm) were not available because only certain soil layers were monitored at specific intervals.

Table 40A Analysis of variance of percent reduction in top growth dry mass of oats caused by atrazine residues at different soil pH levels (Table 34, Chapter 9)

	Percent reduction in top growth dry mass			
Source	DF	MS	F value	PR > F
pH	5	10170	157.28	0.0001
Day (D)	4	20830	322.14	0.0001
Atrazine (A)	1	13187	203.95	0.0001
pH x D	20	676	10.45	0.0001
pH x A	5	120	1.86	0.1064
D x A	4	448	6.94	0.0001
pH x D x A	20	230	3.56	0.0001
Error	120	64		
Total	179			
C.V. (%)		17		
R^2		0.95		

Table 41A Analysis of variance of percent damage caused to oats by the lowest range of atrazine rates used to obtain dose-response curves for three soils (Data in Table 21B)

	Percent damage in top growth dry mass			
Source	DF	MS	F value	PR > F
Soil (S)	2	1310.2	80.7	0.0001
Atrazine (A)	7	11216.0	691.1	0.0001
S x A	14	177.6	10.9	0.0001
Error	48	16.2		
Total	71			
C.V. (%)		9		
R^2		0.99		

Table 42A Analysis of variance of percent damage caused to oats by the first intermediate range of atrazine rates used to obtain dose-response curves for 12 soils (Data in table 21B)

	Percent damage in top growth dry mass			
Source	DF	MS	F value	PR > F
Soil (S)	11	685	33.40	0.0001
Atrazine (A)	7	27223	1327.17	0.0001
S x A	77	71	3.48	0.0001
Error	192	20		
Total	287			
C.V. (%)		8		
R^2		0.98		

Table 43A Analysis of variance of percent damage caused to oats by the second intermediate range of atrazine rates used to obtain dose-response curves for five soils (Data in Table 21B)

	Percent damage in top growth dry mass			
Source	DF	MS	F value	PR > F
Soil (S)	4	2092	51.46	0.0001
Atrazine (A)	6	12755	313.75	0.0001
S x A	24	301	7.42	0.0001
Error	70	41		
Total	104			
C.V. (%)		17		
R^2		0.97		

Table 44A Analysis of variance of percent damage caused to oats by the highest range of atrazine rates used to obtain dose-response curves for five soils (Data in Table 21B)

	Percent damage in top growth dry mass			
Source	DF	MS	F value	PR > F
Soil (S)	4	962	39.12	0.0001
Atrazine (A)	6	18617	756.72	0.0001
S x A	24	104	4.21	0.0001
Error	70	25		
Total	104			
C.V. (%)		9		
R^2		0.98		

Table 45A Analysis of variance of estimated amounts of residual atrazine which were available to the test plant at certain intervals after application of the herbicide (Table 36, Chapter 9)

	Concentration (mg kg^{-1})			
Source	DF	MS	F value	PR > F
Soil (S)	24	0.0068	22.37	0.0001
Days (D)	5	0.3063	1002.47	0.0001
S x D	120	0.0015	5.04	0.0001
Error	300	0.0003		
Total	449			
C.V. (%)		17		
R^2		0.95		

Table 46A Stepwise procedure for dependent variable (atrazine half-life)

Variable entered in sequence	Variable	Parameter estimate	Standard error	F-value	Prob > F
$[pH]^2$	Intercep	10.6015	9.1	1.36	0.2560
(r^2=0.6938)	$[pH]^2$	1.7368	0.2	52.13	0.0001
% C	Intercep	-2.2907	7.6	0.09	0.7678
(R^2=0.8270)	% C	20.8124	5.0	16.93	0.0005
	$[pH]^2$	1.7752	0.2	91.96	0.0001
$[CEC]^2$	Intercep	2.9517	8.2	0.13	0.7248
(R^2=0.8431)	% C	19.0224	5.0	14.04	0.0012
	$[pH]^2$	1.6246	0.2	61.35	0.0001
	$[CEC]^2$	0.0060	0.0	2.17	0.1558
Removed:					
$[CEC]^2$					

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APPENDIX B

Table 1B Composition of the Nitsch (1972) nutrient solution used in certain pot experiments

Combination[1]	Salt	Concentration g 10 L^{-1}
A	KNO_3	610
	KH_2PO_4	310
B	$MgSO_4.7H_2O$	610
	$(NH_4)_2SO_4$	310
C	$Ca(NO_3)_2.4H_2O$	2440
	$EDTA.Na_2Fe$	60
D	KCL	6.1
	H_3BO_3	6.7
	$MnSO_4.H_2O$	3.8
	$ZnSO_4.7H_2O$	0.61
	$(NH_4)_6Mo_7O_{24}.4H_2O$	6.1
	$CuSO_4.5H_2O$	0.31
	H_2SO_4	0.31 cm^3

[1]A, B, C and D were made up separately to 10 L using deionised water. Once dissolved, these combinations were combined and made up to 2219 L using deionised water.

Table 2B Percent reduction in the top growth dry mass of the test plant oats at 10 sites, 35 days after atrazine application (ANOVA in Table 22A)

	Atrazine rate (kg ai ha^{-1})					
Locality	0.031	0.062	0.125	0.250	0.500	Mean
	%	%	%	%	%	
Bapsftn. A	4.4	13.8	19.9	28.5	72.2	27.7
Bapsftn. B	5.5	12.1	23.9	60.2	81.9	36.7
Ermelo	8.8	13.2	34.8	62.0	94.4	39.0
Kroonstad	16.4	46.1	77.4	97.4	99.7	67.4
Nelspruit	24.9	62.9	99.8	100.0	100.0	77.5
Pretoria	15.5	30.7	63.0	85.1	94.4	57.8
Standerton	1.3	18.5	19.3	64.2	87.4	38.1
Ventersdorp	30.2	35.0	62.4	90.7	97.9	63.2
Warmbad A	16.3	19.2	23.8	53.3	82.6	39.0
Warmbad B	8.0	8.2	23.0	62.6	88.2	38.0
LSD_T (0.05)	Locality x Atrazine rate = 27.3					

Table 3B Percent reduction in the top growth dry mass of the test plant oats at seven sites, 182 days after atrazine application (ANOVA in Table 23A)

	Atrazine rate (kg ai ha^{-1})					
Locality	0.031	0.062	0.125	0.250	0.500	Mean
	%	%	%	%	%	
Bapsftn. A	13.2	8.8	1.5	11.2	9.0	9.0
Bapsftn. B	5.8	9.8	17.4	30.0	62.2	25.0
Ermelo	2.2	0.0	10.4	8.8	12.8	6.8
Kroonstad	3.4	4.4	21.4	38.2	87.2	30.9
Pretoria	-3.8	14.8	33.6	38.6	75.8	31.8
Warmbad A	10.3	10.3	24.3	36.0	85.7	33.3
Warmbad B	8.2	18.0	29.2	27.8	62.2	29.1
LSD_T (0.05)	Locality x Atrazine rate = 43					

Table 4B Percent reduction in the top growth dry mass of the test plant oats at seven sites, 365 days after atrazine application (ANOVA in Table 24A)

	Atrazine rate (kg ai ha^{-1})					
Locality	0.031	0.062	0.125	0.250	0.500	Mean
	%	%	%	%	%	
Bapsftn. A	-7.3	-1.2	0.8	-1.2	2.1	-1.4
Bapsftn. B	6.7	5.8	4.6	5.9	11.0	6.8
Ermelo	0.3	-10.9	-1.0	-0.0	8.5	-0.6
Kroonstad	4.5	-9.4	-3.4	-4.0	-9.7	-4.4
Pretoria	11.6	11.1	10.5	15.6	11.3	12.0
Warmbad A	8.1	7.1	18.5	6.5	18.4	11.7
Warmbad B	-37.4	-27.8	-21.3	-0.6	4.4	-16.5
LSD_T (0.05)			Locality = 22			

Table 5B Dry bean yield and percentage reduction in yield 12 months after atrazine application in maize (ANOVA for percentage data appears in Table 27A; data for recommended rate only are presented in Table 27, Chapter 6)

	Atrazine rate number[3]												
Locality	Control	1		2		3		4		5		6	
	kg[1]	%[2]	kg	%	kg	%	kg	%	kg	%	kg	%	kg
Carltnv.	0.483	4	0.466	0	0.481	9	0.442	4	0.465	3	0.468	8	0.447
Baps. A	0.520	0	0.518	2	0.511	5	0.495	7	0.485	7	0.485	6	0.487
Baps. B	0.478	-1	0.483	1	0.475	4	0.461	1	0.472	-2	0.485	-2	0.486
Vryheid	0.232	3	0.224	10	0.210	10	0.208	17	0.192	19	0.188	21	0.183
Pta. A	0.748	-2	0.766	-2	0.760	1	0.744	-2	0.764	-3	0.772	0	0.747
Pta. B	0.808	0	0.808	-1	0.817	1	0.800	1	0.802	-1	0.819	2	0.791
Delmas	0.279	2	0.273	4	0.268	5	0.264	8	0.258	11	0.249	17	0.231
Krnstad.	0.729	1	0.723	2	0.716	3	0.705	5	0.695	8	0.674	9	0.664

[1]Kilogram seed per 4 m row section. Formula for transformation to ton ha^{-1} = 111.1[25(kg seed 4 m^{-1})]/1000.
[2]Percent reduction in yield relative to control (0 atrazine).
[3]Different atrazine rates were used in each trial. Rates used appear in Table 26, Chapter 6. Underlined values were measured at the recommended rate for each locality.

NB The trial at Warmbad was terminated when 90-100% of seedlings died soon after emergence on all plots treated with atrazine.

Table 6B Dry bean stand and percentage reduction in stand 12 months after atrazine application in maize (ANOVA for percentage data appears in Table 28A)

Locality	Atrazine rate number[3]												
	Control	1		2		3		4		5		6	
	no.[1]	%[2]	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Carletnv.	47	0	47	-2	48	-2	48	0	47	0	47	0	47
Baps. A	45	0	45	0	45	4	43	2	44	0	45	2	44
Baps. B	40	0	40	3	39	5	38	0	40	0	40	3	39
Vryheid	42	0	42	2	41	2	41	0	42	0	42	0	42
Pta. A	37	3	36	3	36	0	37	3	36	3	36	3	36
Pta. B	35	0	35	0	35	-3	36	0	35	0	35	0	35
Delmas	32	0	32	3	31	0	32	3	31	3	31	3	31
Krnstad.	33	0	33	0	33	-3	34	3	32	0	33	3	32

[1]Number of plants per 4 m row section monitored.
[2]Percent reduction in stand relative to control.
[3]Different atrazine rates were used at each locality. Rates used are given in Table 26 (Chp. 6). Underlined values were measured at recommended rates for each locality.

Table 7B Sunflower yield and percentage reduction in yield 12 months after atrazine application in maize (ANOVA for percentage data appears in Table 29A; percentage data for recommended rates only appear in Table 27, Chapter 6)

Locality	Atrazine rate number[3]												
	Control	1		2		3		4		5		6	
	kg[1]	%[2]	kg	%	kg	%	kg	%	kg	%	kg	%	kg
Carltnv.	1.293	14	1.117	18	1.063	21	1.025	21	1.016	25	0.972	37	0.818
Baps. A	1.328	10	1.190	17	1.103	19	1.078	21	1.050	23	1.022	35	0.858
Baps. B	1.526	10	1.373	15	1.296	14	1.305	17	1.270	13	1.321	18	1.247
Vryheid	1.340	0	1.340	1	1.330	2	1.315	1	1.326	1	1.327	5	1.274
Pta. A	2.107	13	1.824	11	1.881	13	1.844	16	1.770	20	1.683	21	1.666
Pta. B	1.458	-6	1.540	-7	1.558	-3	1.505	3	1.411	-1	1.467	4	1.395
Delmas	1.261	12	1.106	15	1.073	. 19	1.027	16	1.064	17	1.043	24	0.961

[1]Kilogram seed per 4 m row section. Formula for transformation to ton ha^{-1} = 111.1[25(kg seed 4 m^{-1})]/1000.
[2]Percent reduction in yield relative to control (0 atrazine).
[3]Different atrazine rates were used in each trial. Rates used appear in Table 26, Chapter 6. Underlined values were measured at the recommended rate for each locality.

NB The trial at Warmbad was terminated when 90-100% of seedlings died soon after emergence on all plots that had been treated with atrazine. Sunflower was not monitored at Kroonstad due to unsatisfactory emergence which was clearly not linked to atrazine damage.

Table 8B Sunflower stand and percentage reduction in stand 12 months after atrazine application in maize (ANOVA for percentage data appears in Table 30A)

Locality	Atrazine rate number[3]												
	Control	1		2		3		4		5		6	
	no.[1]	%[2]	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Carletnv.	16.0	6	15.0	13	14.0	15	13.6	16	13.4	18	13.2	26	11.8
Baps. A	14.2	9	12.8	6	13.4	17	11.8	14	12.2	18	11.6	18	11.6
Baps. B	15.2	0	15.2	1	15.0	1	15.0	0	15.2	3	14.8	11	13.6
Vryheid	14.2	0	14.2	0	14.2	-1	14.4	0	14.2	1	14.0	4	13.6
Pta. A	14.4	7	13.4	3	14.0	3	14.0	3	14.0	8	13.2	6	13.6
Pta. B	13.6	3	13.2	3	13.2	3	13.2	3	13.2	0	13.6	6	12.8
Delmas	12.4	2	12.2	2	12.2	3	12.0	3	12.0	2	12.2	6	11.6

[1]Number of plants per 4 m row segment monitored.
[2]Percent reduction in stand relative to control.
[3]Different atrazine rates were used at each locality. Rates used are given in Table 26 (Chp. 6). Underlined values were measured at recommended rates for each locality.

Table 9B Dry bean yield and percentage reduction in yield 24 months after atrazine application in maize at Warmbad (ANOVA for percentage data appears in Table 31A)

Atrazine rate	Yield (4 m row segment)		Plants (4 m row segment)	
kg ai ha^{-1}	%[1]	kg	%[1]	no.
0	-	0.197	-	38.0
1.8	23	0.151	11	33.8
2.1	21	0.155	4	36.6
2.4[2]	38	0.121	10	34.2
2.7	42	0.114	41	22.2
3.0	48	0.103	35	24.6
3.3	50	0.098	18	31.2
LSD_T (0.05)		0.015		15.7
CV%		6		25

[1]Percent reduction in yield or stand compared to the controls (0 atrazine). ANOVAS for percentage data appear in Table 31A.
[2]Recommended herbicide rate = 2.4 kg ai ha^{-1}.

NB Warmbad was the only site at which significant damage to dry beans was observed 12 months previously.

Table 10B Sunflower yield and percentage reduction in yield 24 months after atrazine application in maize (ANOVA for percentage data appears in Table 32A; percentage data for recommended rates only are given in Table 28, Chapter 6)

Locality	Atrazine rate number[3]												
	Control	1		2		3		4		5		6	
	kg[1]	%[2]	kg	%	kg	%	kg	%	kg	%	kg	%	kg
Carltnv.	1.200	1	1.192	0	1.195	2	1.180	1	1.188	1	1.187	0	1.200
Baps. A	1.050	2	1.032	0	1.046	0	1.047	0	1.053	1	1.037	0	1.051
Baps. B	1.265	0	1.260	1	1.247	1	1.251	1	1.256	1	1.247	1	1.257
Pta. A	1.800	-2	1.839	-2	1.833	-1	1.816	-1	1.815	1	1.789	0	1.806
Delmas	1.560	2	1.524	0	1.555	1	1.546	0	1.555	-1	1.572	0	1.563
Warmbad	1.419	29	1.007	28	1.024	29	1.008	38	0.872	40	0.845	41	0.843

[1]Kilogram seed per 4 m row section. Formula for transformation to ton ha^{-1} = 111.1[25(kg seed 4 m^{-1})]/1000.
[2]Percent reduction in yield compared to control (0 atrazine).
[3]Different atrazine rates were used in each trial. Rates used appear in Table 26, Chapter 6. Underlined values were measured at the recommended rate for each locality.

Table 11B Sunflower stand and percentage reduction in stand 24 months after atrazine application in maize (ANOVA for percentage data appears in Table 32A; percentage data for recommended rates only appear in Table 28, Chapter 6)

Locality	Atrazine rate number[3]												
	Control	1		2		3		4		5		6	
	no.[1]	%[2]	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Carletnv.	14.0	3	13.6	0	14.0	0	14.0	3	13.6	0	14.0	0	14.0
Baps. A	14.0	0	14.0	0	14.0	3	13.6	3	13.6	0	14.0	0	14.0
Baps. B	14.0	3	13.6	0	14.0	0	14.0	3	13.6	0	14.0	3	13.6
Pta. A	14.0	0	14.0	0	14.0	6	13.2	3	13.6	0	14.0	3	13.6
Delmas	14.0	0	14.0	0	14.0	0	14.0	6	13.2	0	14.0	3	13.6
Warmbad	14.0	1	13.9	3	13.6	6	13.2	14	12.0	7	13.0	4	13.4

[1]Number of plants per 4 m row segment monitored.
[2]Percent reduction in stand relative to control.
[3]Different atrazine rates were used at each locality. Rates used are given in Table 26 (Chp. 6). Underlined values were measured at recommended rates for each locality.

Table 12B Rainfall and mean daily maximum and minimum temperatures recorded at Kroonstad for the period after atrazine application on 27 November 1987 until the seeding of dry beans and sunflower on 3 December 1988 (Chapter 6)

Period	Rainfall[a] (mm)		Temperature (°C)[b] Max.		Min.	
27 Nov-31 Dec 1987	56		29		15	
Jan. 1988	17	(99)	32	(28)	16	(15)
Feb.	89	(81)	28	(27)	17	(15)
Mar.	220	(96)	27	(26)	15	(13)
Apr.	126	(55)	22	(22)	9	(9)
May	15	(19)	21	(20)	3	(5)
Jun.	12	(6)	16	(16)	-1	(1)
Jul.	1	(6)	19	(17)	-1	(0)
Aug.	1	(17)	22	(20)	2	(2)
Sept.	45	(33)	23	(24)	7	(8)
Oct.	152	(67)	24	(26)	10	(11)
Nov.	93	(80)	26	(27)	12	(13)
30 Nov-3 Dec	23		25		13	
Total rainfall	850	(632)				

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 13B Rainfall and mean daily maximum and minimum temperatures recorded at Vryheid for the period after atrazine application on 23 November 1987 until the seeding of dry beans and sunflower on 5 December 1988 (Chapter 6)

		Temperature (°C)[b]	
Period	Rainfall[a] (mm)	Max.	Min.
23 Nov-31 Dec 1987	90	27	17
Jan. 1988	95 (133)	27 (26)	16 (15)
Feb.	95 (138)	25 (25)	16 (15)
Mar.	96 (95)	24 (25)	16 (15)
Apr.	66 (37)	20 (23)	12 (12)
May	3 (10)	22 (22)	9 (10)
Jun.	30 (25)	18 (19)	7 (7)
Jul.	23 (7)	20 (19)	6 (6)
Aug.	75 (24)	22 (21)	9 (8)
Sept.	20 (45)	22 (22)	11 (10)
Oct.	135 (106)	21 (23)	11 (11)
Nov.	93 (100)	21 (23)	12 (12)
30 Nov-5 Dec	51	22	14
Total rainfall	872 (869)		

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 14B Rainfall and mean maximum and minimum temperatures recorded at Carletonville for the period after atrazine application on 1 December 1987 until the seeding of dry beans and sunflower on 6 December 1988 (Chapter 6)

		Temperature (°C)[b]	
Month	Rainfall[a] (mm)	Max.	Min.
Dec. 1987	110 (109)	27 (27)	18 (14)
Jan. 1988	45 (120)	29 (27)	16 (14)
Feb.	50 (78)	27 (27)	16 (14)
Mar.	113 (79)	26 (25)	14 (12)
Apr.	32 (56)	22 (23)	9 (8)
May	30 (12)	21 (20)	3 (3)
Jun.	13 (7)	17 (17)	0 (0)
Jul.	2 (3)	19 (18)	-1 (0)
Aug.	2 (7)	22 (20)	3 (2)
Sept.	113 (19)	27 (24)	8 (7)
Oct.	84 (71)	24 (25)	11 (10)
Nov.	46 (89)	25 (26)	13 (13)
30 Nov-6 Dec	8	23	14
Total rainfall[c]	648 (665)		

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 15B Rainfall and mean daily maximum and minimum temperatures recorded at Delmas for the period after atrazine application on 1 December 1987 until the seeding of dry beans and sunflower on 6 December 1988 (Chapter 6)

Period	Rainfall[a] (mm)	Temperature (°C)[b] Max.	Temperature (°C)[b] Min.
Dec. 1987	86 (91)	26 (26)	13 (13)
Jan. 1988	89 (94)	28 (27)	15 (14)
Feb.	48 (75)	26 (26)	14 (13)
Mar.	77 (80)	26 (25)	13 (11)
Apr.	25 (28)	22 (23)	8 (7)
May	2 (4)	21 (21)	2 (2)
Jun.	18 (6)	17 (17)	-1 (0)
Jul.	7 (1)	19 (18)	-1 (-1)
Aug.	0 (5)	21 (20)	1 (1)
Sept.	55 (42)	21 (37)	7 (7)
Oct.	81 (72)	23 (24)	10 (10)
Nov.	20 (103)	24 (25)	11 (11)
30 Nov-6 Dec	7 (91)	25 (26)	13 (13)
Total rainfall[c]	515 (607)		

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 16B Rainfall and maximum and minimum temperatures recorded at Pretoria for the period after atrazine application on 10 November 1987 and the seeding of dry beans and sunflower on 15 November 1988 (Chapter 6)

Period	Rainfall[a] (mm)		Temperature (°C)[b]			
			Max.		Min.	
10 Nov-30 Nov 1987	54		26		15	
Dec. 1987	84	(110)	28	(28)	18	(16)
Jan. 1988	64	(133)	30	(28)	18	(17)
Feb.	37	(77)	28	(27)	17	(17)
Mar.	138	(84)	27	(26)	16	(16)
Apr.	78	(49)	24	(23)	12	(12)
May	0	(11)	22	(21)	9	(8)
Jun.	9	(4)	18	(18)	7	(4)
Jul.	3	(2)	20	(19)	4	(4)
Aug.	0	(6)	23	(21)	9	(7)
Sept.	34	(21)	25	(25)	11	(11)
Oct.	70	(69)	25	(26)	13	(14)
1 Nov-15 Nov	23		26		14	
Total rainfall[c]	594	(668)				

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 17B Rainfall and maximum and minimum temperatures recorded at Bapsfontein for the period after atrazine application on 13 November 1987 until the seeding of dry beans and sunflower on 16 November 1988 (Chapter 6)

			Temperature (°C)[b]			
Period	Rainfall[a] (mm)		Max.		Min.	
13 Nov-30 Nov 1987	53		24		12	
Dec. 1987	105	(102)	27	(26)	14	(13)
Jan. 1988	100	(139)	29	(27)	15	(14)
Feb.	47	(108)	27	(26)	14	(13)
Mar.	129	(89)	26	(25)	13	(12)
Apr.	77	(38)	22	(23)	9	(8)
May	2	(5)	21	(20)	4	(4)
Jun.	20	(14)	17	(17)	1	(1)
Jul.	4	(6)	19	(18)	2	(1)
Aug.	0	(6)	21	(24)	5	(4)
Sept.	69	(34)	23	(23)	9	(7)
Oct.	70	(76)	24	(25)	9	(10)
1 Nov-16 Nov	170		25		8	
Total rainfall[c]	846	(739)				

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 18B Rainfall and the mean daily maximum and minimum temperature recorded at Towoomba for the period after atrazine application on 3 December 1987 until the seeding of dry beans and sunflower on 10 December 1988 (Chapter 6)

			Temperature (°C)[b]			
Period	Rainfall[a] (mm)		Max.		Min.	
3 Dec-31 Dec 1987	161		29		17	
Jan. 1988	39	(113)	31	(29)	17	(17)
Feb.	88	(87)	29	(29)	17	(16)
Mar.	107	(76)	28	(28)	16	(14)
Apr.	43	(37)	25	(26)	12	(11)
May	0	(6)	24	(23)	6	(6)
Jun.	63	(5)	20	(20)	3	(3)
Jul.	0	(2)	22	(21)	2	(3)
Aug.	1	(4)	25	(24)	6	(5)
Sept.	36	(16)	27	(27)	10	(10)
Oct.	133	(61)	27	(29)	13	(13)
Nov.	18	(102)	28	(29)	14	(15)
1 Dec-10 Dec	21		28		16	
Total rainfall[c]	710	(634)				

[a]Long-term average for the monthly total appears in parenthesis.
[b]Long-term mean daily maximum and minimum temperatures appear in parenthesis.
[c]Long-term yearly rainfall (1 Jan-31 Dec) appears in parenthesis.

Table 19B Effect of temperature and soil water on amount of atrazine (mg kg^{-1}) remaining 30 days after application to a loamy sand and a clay soil (Chapter 7) - ANOVA in Table 35A

		Temp. (day/night)								
		30/16 °C			30/8 °C			16/8 °C		
		Soil water								
Soil type	Atrazine rate (mg kg^{-1})	0	fc	2xfc	0	fc	2xfc	0	fc	2xfc
		mg kg^{-1}			mg kg^{-1}			mg kg^{-1}		
Loamy sand	1	0.94	0.76	0.71	0.92	0.72	0.74	0.93	0.85	0.81
	2	1.95	1.30	1.28	1.93	1.27	1.35	1.96	1.63	1.58
Clay	1	1.00	0.92	0.95	1.03	0.87	0.93	0.97	1.01	0.96
	2	2.00	1.91	1.93	2.00	1.95	1.93	1.96	1.91	1.96
$LSD_T(0.05)$		Atrazine x Soil x Temp. x Water=0.33								

Table 20B Effect of temperature and soil water on amount of atrazine (mg kg^{-1}) remaining 60 days after application to a loamy sand and a clay soil (Chapter 7) - ANOVA in Table 36A

		Temp. (day/night)								
		30/16 °C			30/8 °C			16/8 °C		
		Soil water								
Soil type	Atrazine rate (mg kg^{-1})	0	fc	2xfc	0	fc	2xfc	0	fc	2xfc
		mg kg^{-1}			mg kg^{-1}			mg kg^{-1}		
Loamy sand	1	0.86	0.45	0.45	0.82	0.60	0.51	0.94	0.70	0.64
	2	1.81	0.90	0.91	1.87	1.06	0.99	1.91	1.33	1.29
Clay	1	0.96	0.73	0.71	0.96	0.74	0.63	0.94	0.80	0.76
	2	1.95	1.57	1.53	1.96	1.59	1.50	1.96	1.72	1.62
$LSD_T(0.05)$		Atrazine x Soil x Water=0.08								

Table 21B Dose-response of the test plant (percent reduction in top growth dry mass of oats) to different ranges of atrazine rates applied to a total of 25 soils (ANOVA for lowest range of rates in Table 41A; ANOVA for 1st intermediate range of rates in Table 42A; ANOVA for 2nd intermediate range of rates in Table 43A; ANOVA for highest range of rates in Table 44A)

Exp. I: Lowest range of atrazine rates

	Atrazine rate (mg kg^{-1})								
Soil	0.002	0.004	0.008	0.016	0.032	0.064	0.128	0.256	Mean
Colby	4	7	15	42	82	89	89	89	52
Fairdale	4	11	13	25	67	75	89	88	46
Nelspruit	3	7	14	19	43	58	75	82	38
LSD_T (P=0.05)	Soil x Atrazine rate = 13								

Exp. II: First intermediate range of atrazine rates

	Atrazine rate (mg kg^{-1})								
Soil	0.0125	0.025	0.05	0.075	0.10	0.125	0.15	0.20	Mean
Bethal	8	20	44	61	75	77	83	82	56
Bothaville	16	35	51	68	77	78	80	83	61
Ermelo A	10	30	44	69	74	79	84	84	59
Leeudoringst. A	19	53	64	69	81	79	84	84	67

Continued overleaf

Table 21B cont.	0.0125	0.025	0.05	0.075	0.10	0.125	0.15	0.20	Mean
Leeudoringst. B	19	32	49	60	74	77	80	81	59
Nylstroom	9	20	45	54	61	73	80	82	53
Pretoria A1	7	14	38	62	69	80	82	82	54
Pretoria A2	5	16	45	59	68	79	83	83	55
Pretoria A3	7	20	40	58	71	78	83	84	55
Pretoria A4	9	26	41	52	69	76	80	82	54
Pretoria A5	4	13	38	52	70	79	82	82	53
Warmbad A	4	9	24	43	56	67	73	81	45
LSD_T (P=0.05)				Soil x Atrazine rate = 16					

Exp. III: Second intermediate range of atrazine rates

	Atrazine rate (mg kg^{-1})							
Soil	0.025	0.05	0.10	0.15	0.20	0.25	0.30	Mean
Carletonville	3	8	33	56	68	90	91	50
Ermelo B	4	-5	2	22	55	64	65	30
Morgenzon	-1	7	23	45	56	89	89	44

Continued overleaf

Table 21B continued

Redhill	1	12	22	43	56	66	65	38
Vryheid	7	7	21	18	29	43	56	26
LSD_T (P=0.05)				Soil x Atrazine rate = 19				

Exp. IV: Highest range of atrazine rates

	Atrazine rate (mg kg^{-1})							
Soil	0.025	0.05	0.10	0.15	0.20	0.30	0.40	Mean
Potgietersrus	-4	21	44	66	89	90	90	57
Pretoria B	4	10	27	42	65	81	83	45
Roodeplaat	8	37	45	64	93	93	94	62
Utrecht	1	8	38	56	77	90	91	52
Warmbad B	4	4	27	58	79	85	86	49
LSD_T (P=0.05)				Soil x Atrazine rate = 15				

APPENDIX C

Contents: Dose-response curves for 25 soils (Chapter 9, Section B)

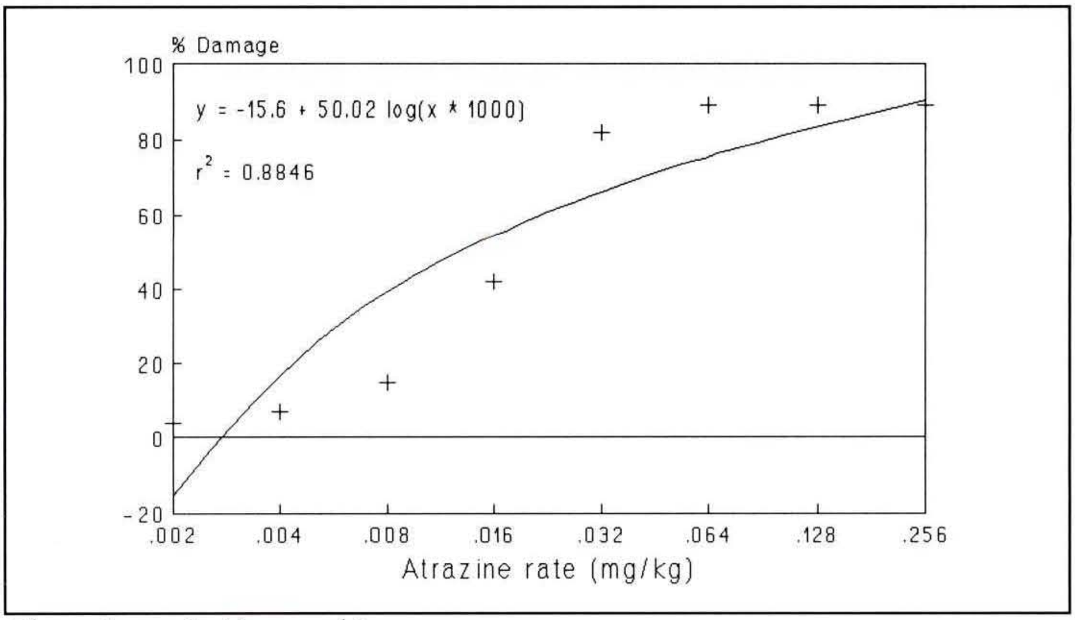

Fig. 1c Colby soil

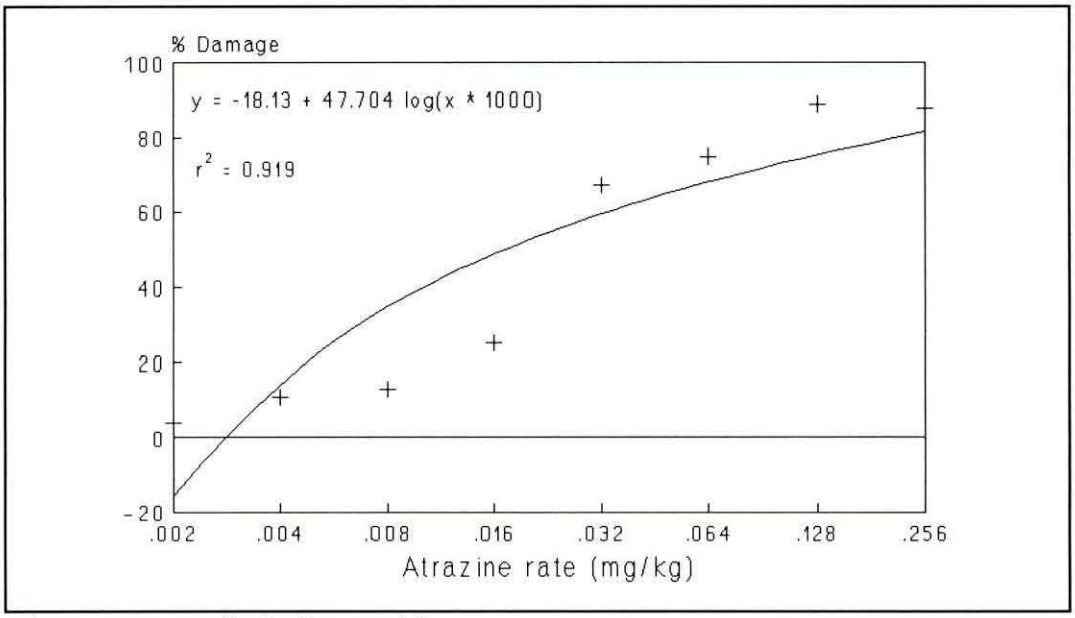

Fig. 2c Fairdale soil

Figures 1C & 2C Dose-response to atrazine in the Colby and Fairdale soils

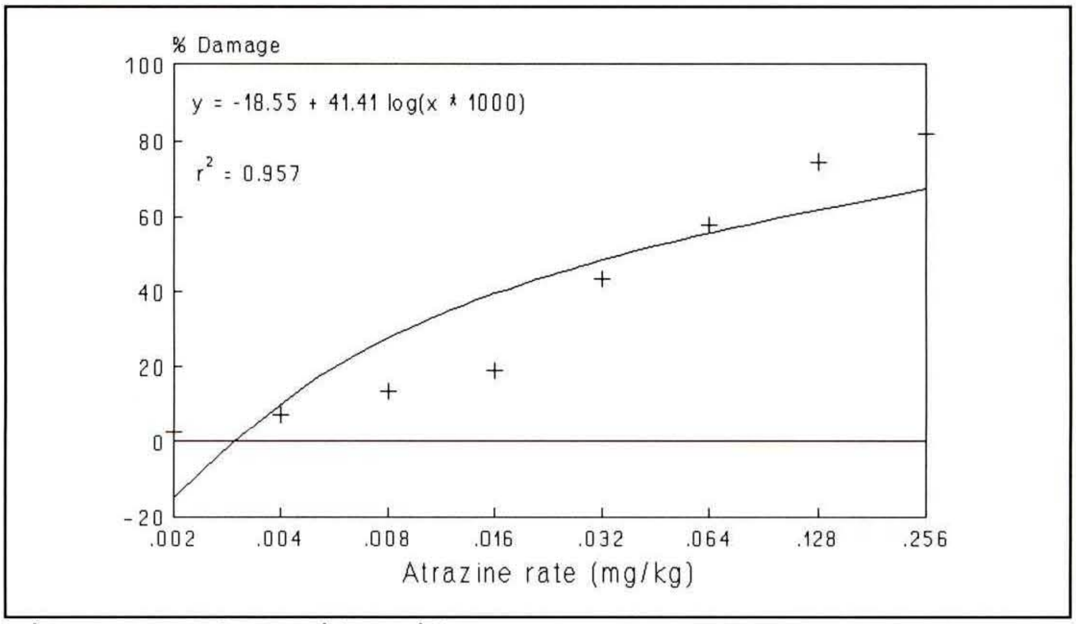

Fig. 3c Nelspruit soil

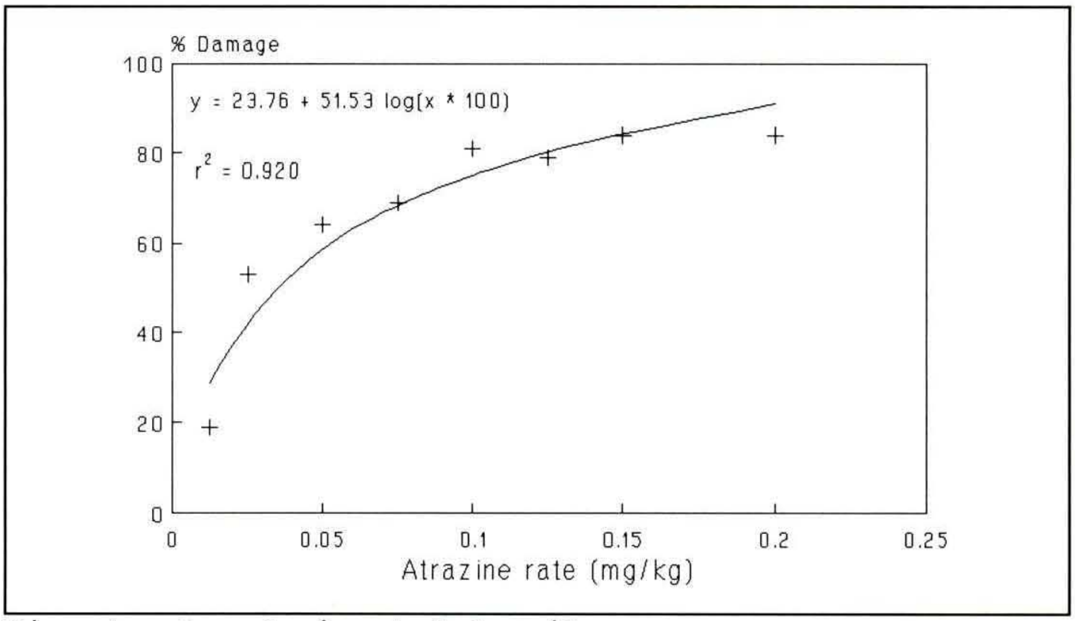

Fig. 4c Leeudoringstad A soil

Figures 3C & 4C Dose-response to atrazine in the Nelspruit and Leeudoringstad A soils

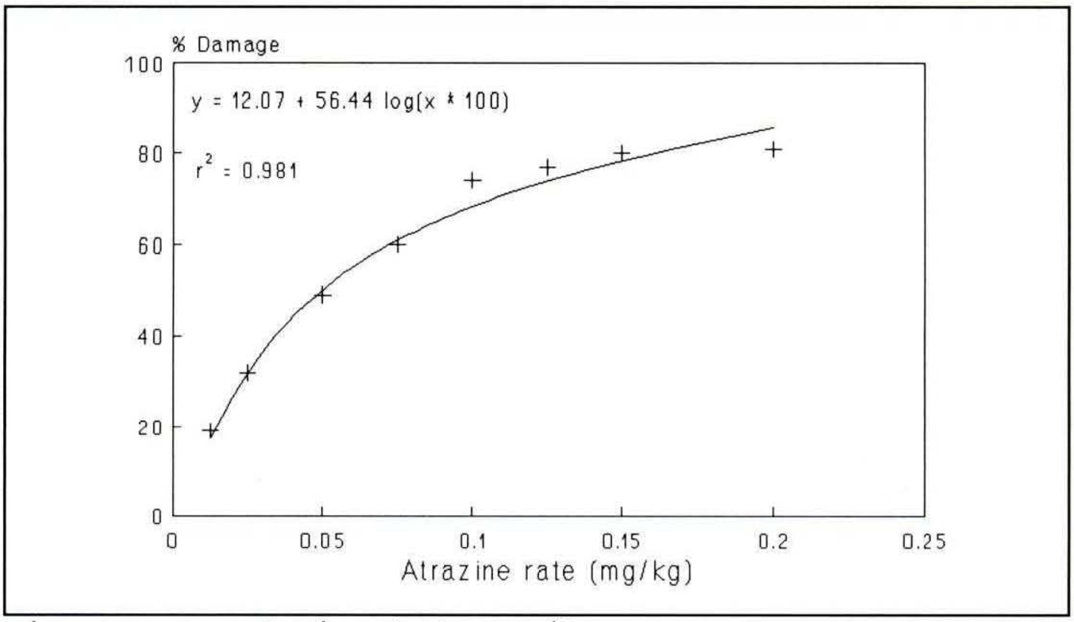

Fig. 5c Leeudoringstad B soil

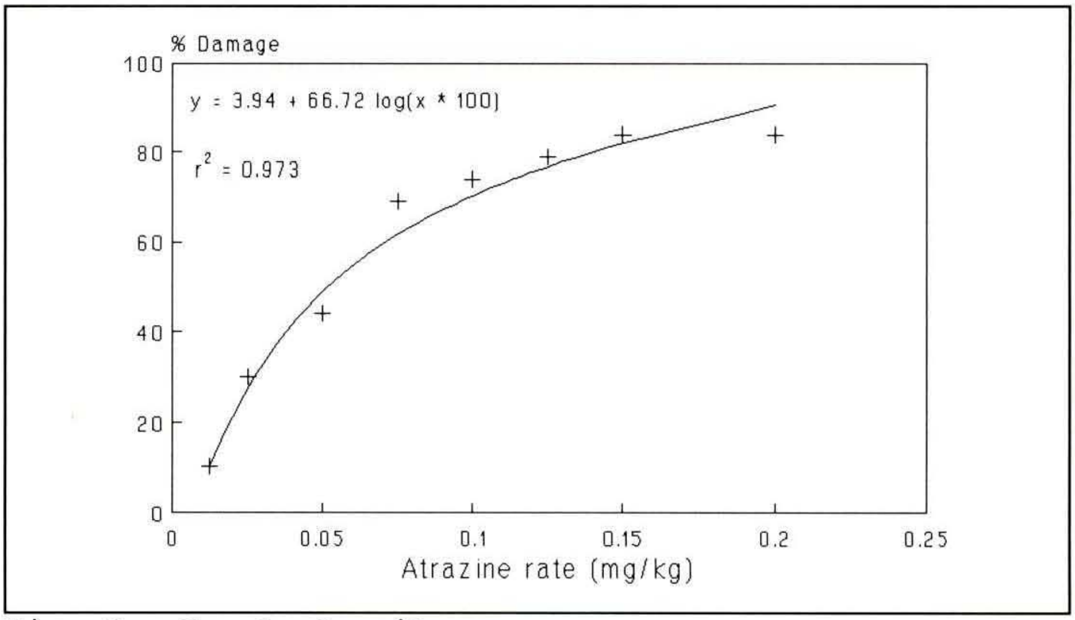

Fig. 6c Ermelo A soil

Figures 5C & 6C Dose-response to atrazine in the Leeudoringstad B and Ermelo A soils

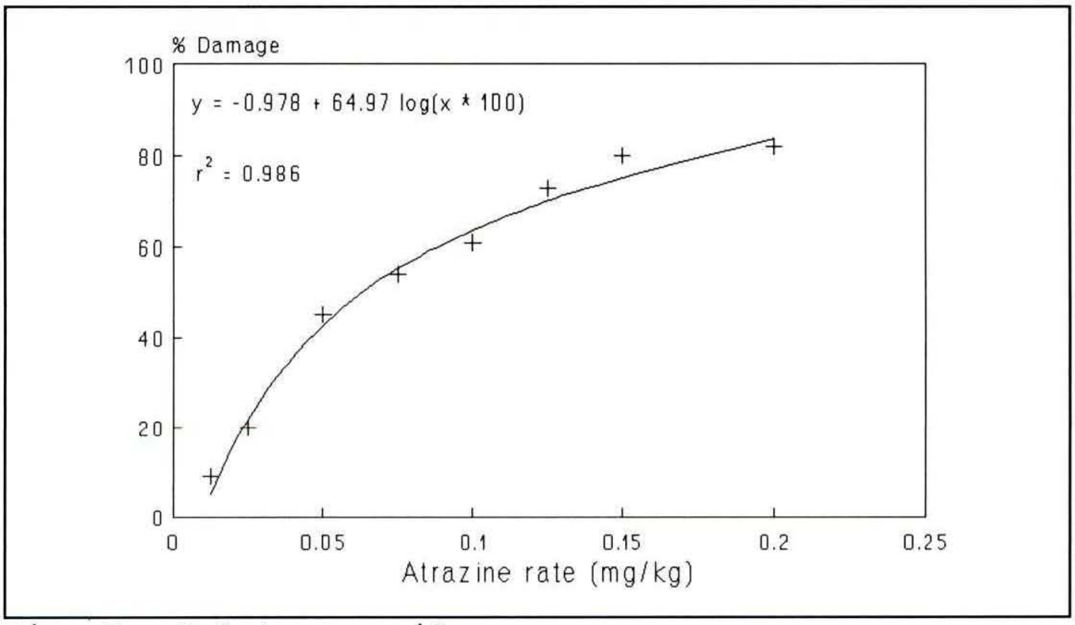

Fig. 7c Nylstroom soil

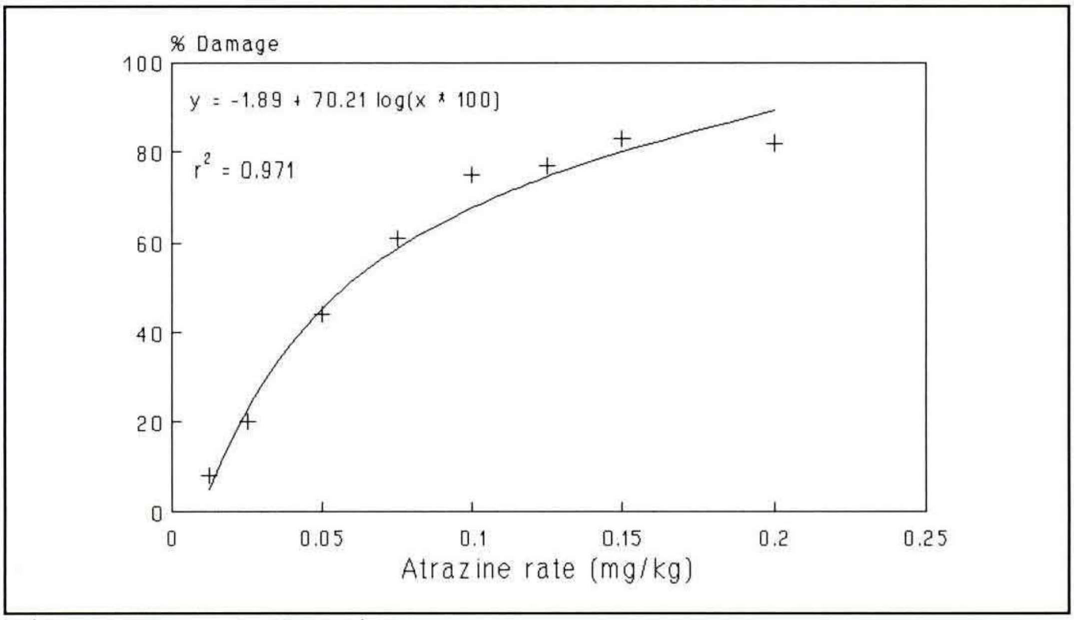

Fig. 8c Bethal soil

Figures 7C & 8C Dose-response to atrazine in the Nylstroom and Bethal soils

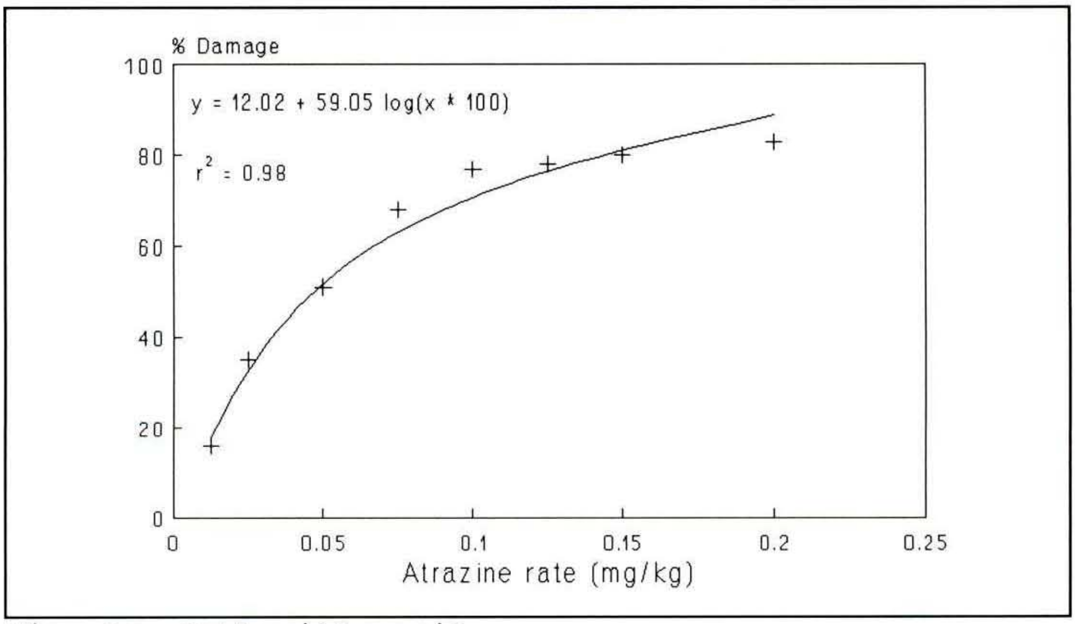

Fig. 9c Bothaville soil

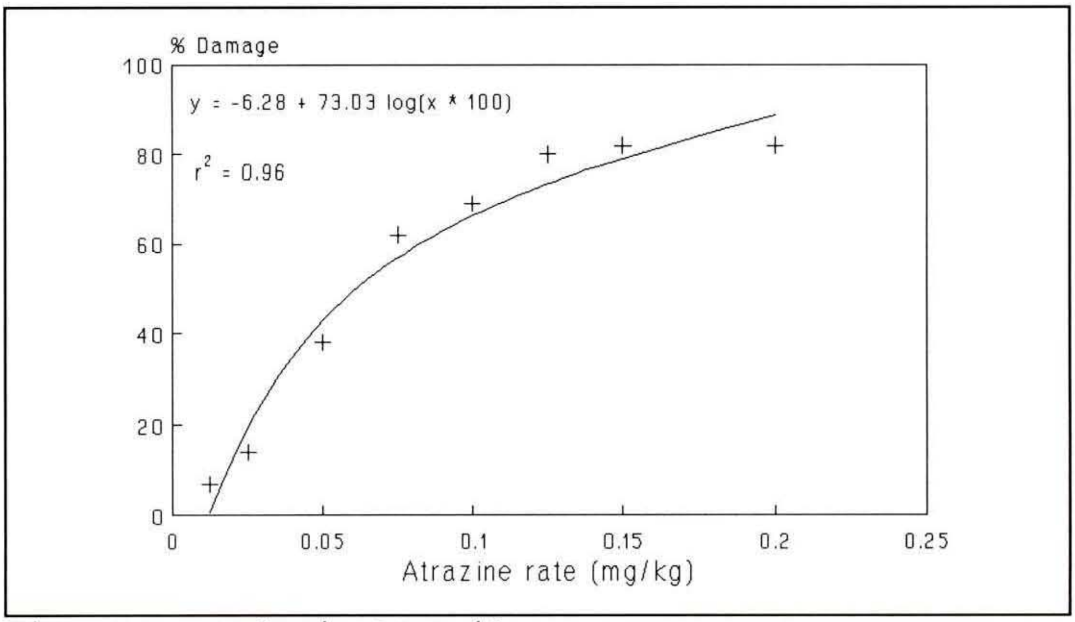

Fig. 10c Pretoria A1 soil

Figures 9C & 10C Dose-response to atrazine in the Bothaville and Pretoria A1 soils

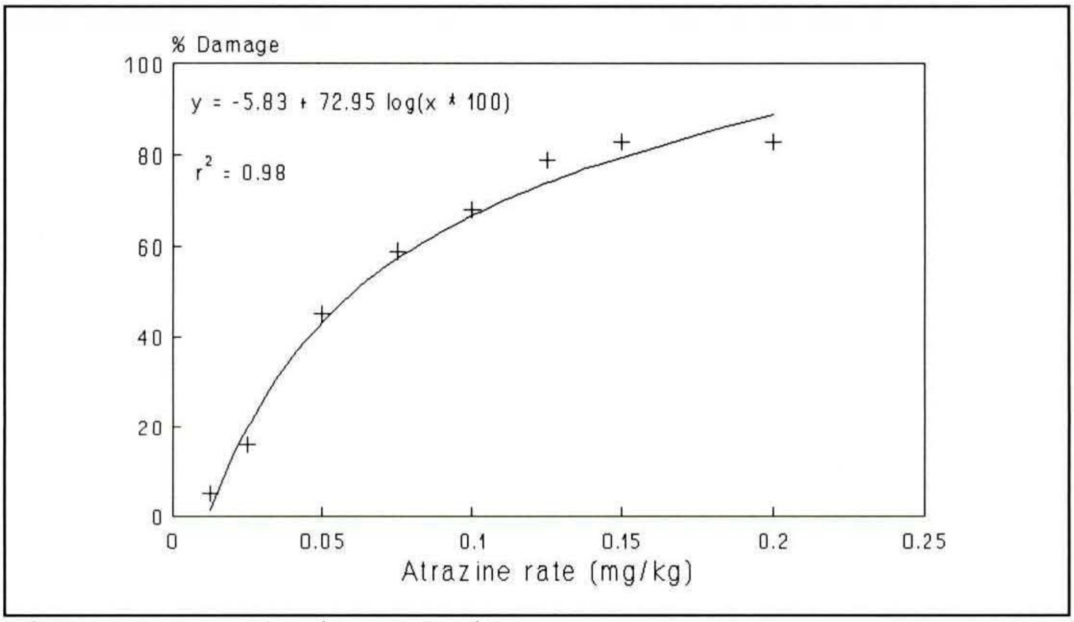

Fig. 11c Pretoria A2 soil

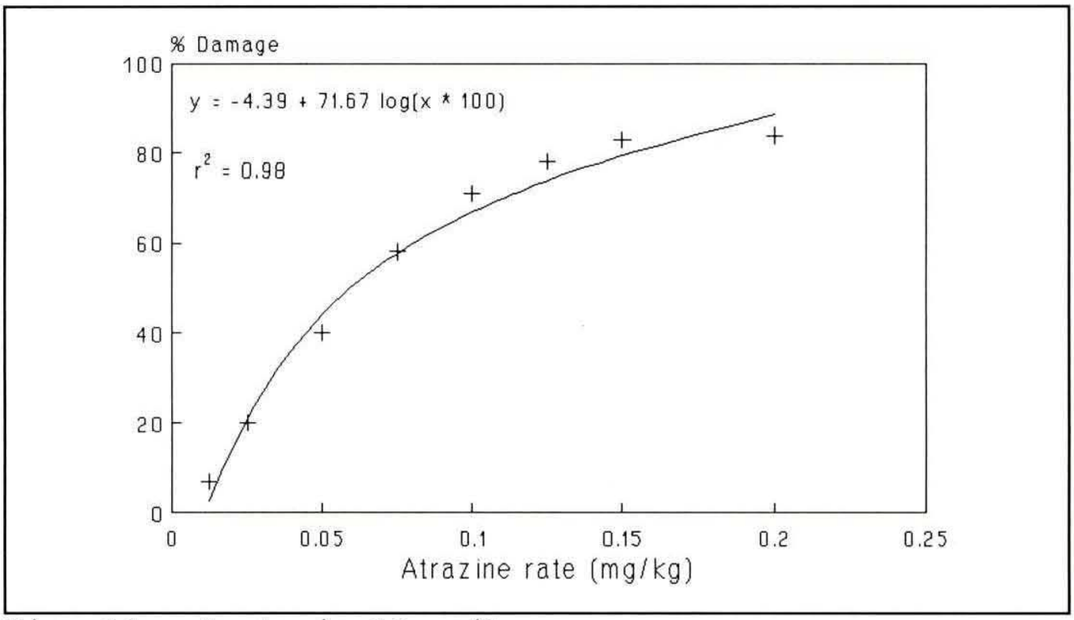

Fig. 12c Pretoria A3 soil

Figures 11C & 12C Dose-response to atrazine in the Pretoria A2 and Pretoria A3 soils

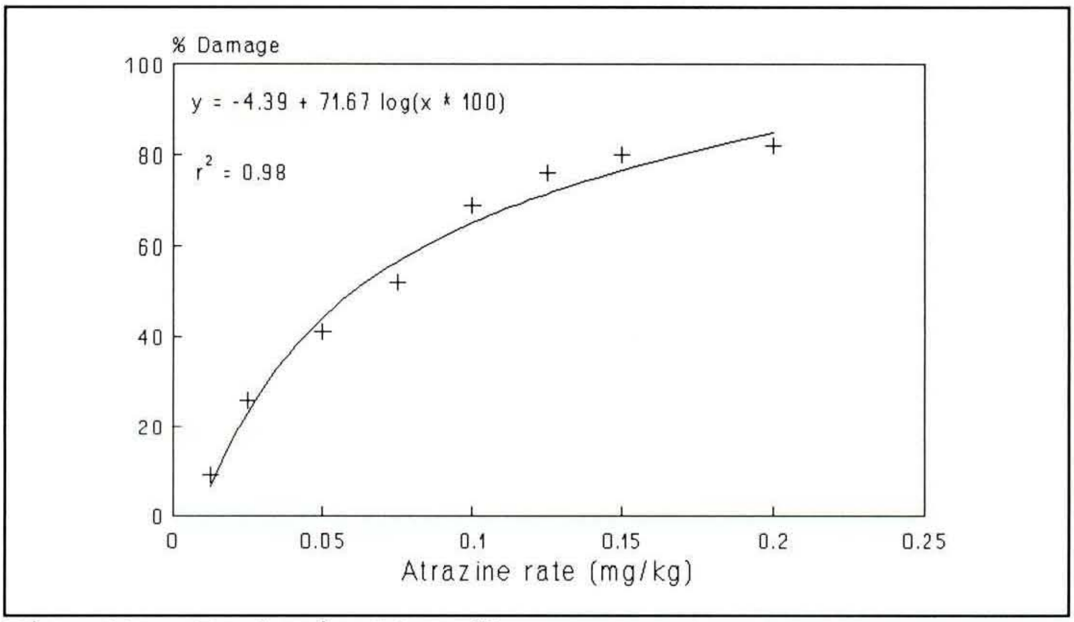

Fig. 13c Pretoria A4 soil

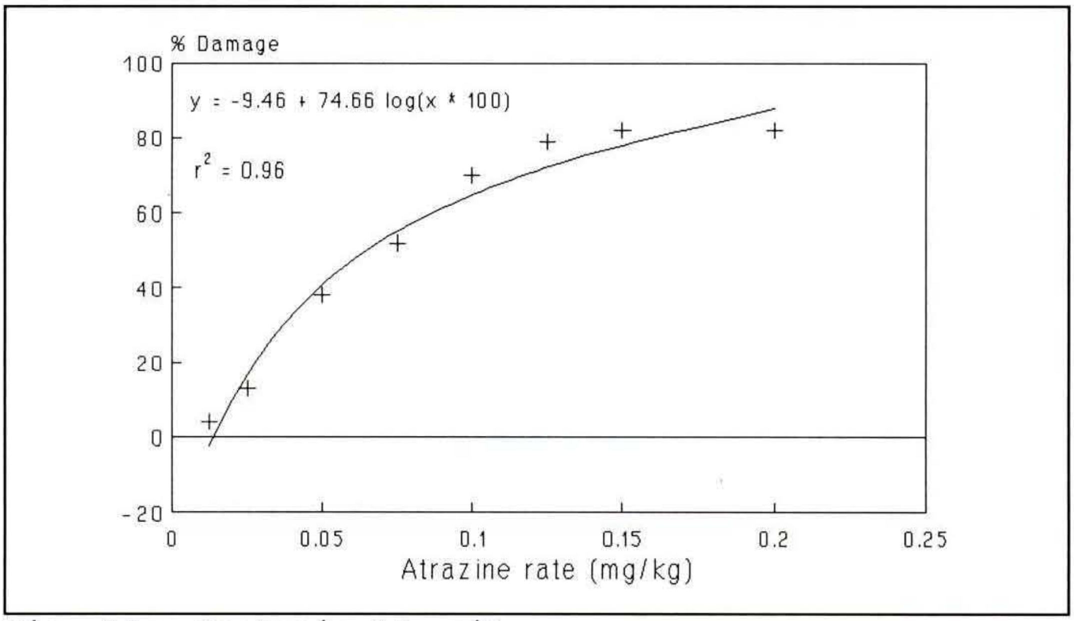

Fig. 14c Pretoria A5 soil

Figures 13C & 14C Dose-response to atrazine in the Pretoria A4 and A5 soils

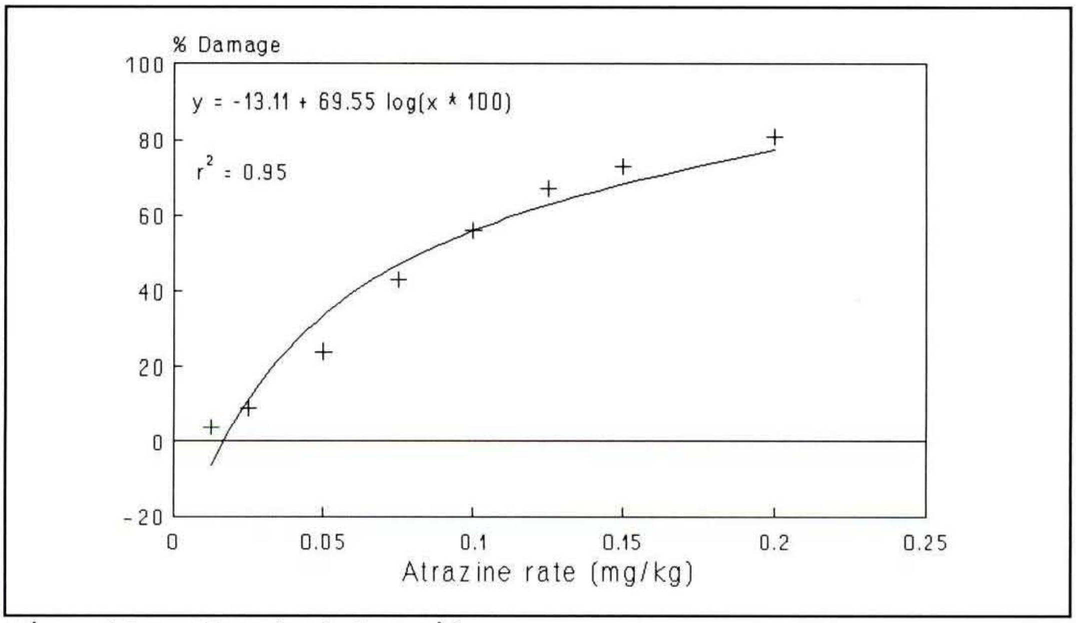

Fig. 15c Warmbad A soil

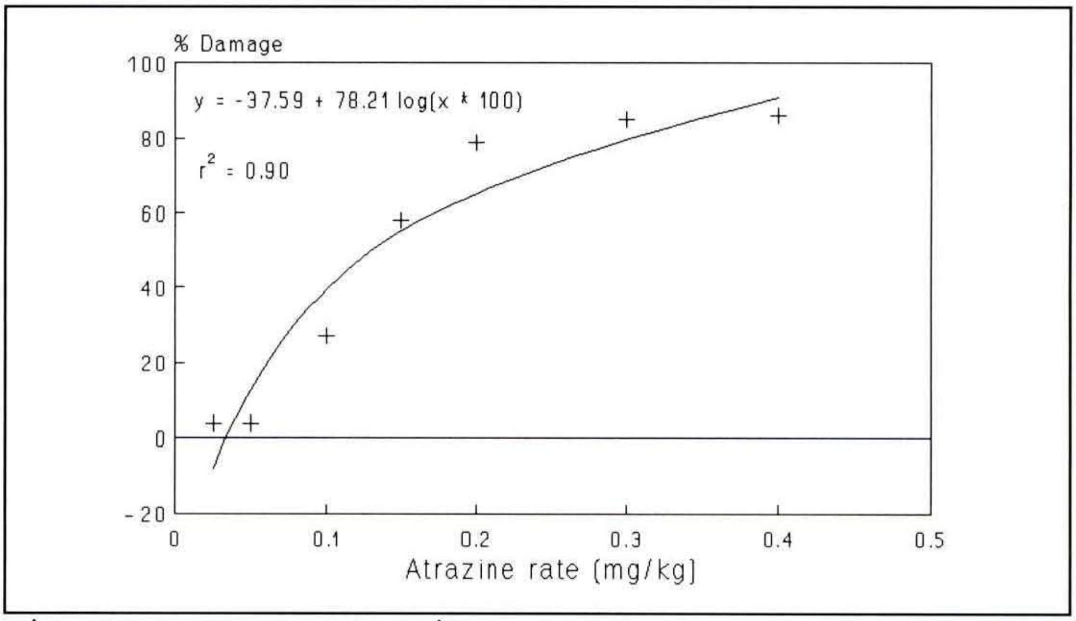

Fig. 16c Warmbad B soil

Figures 15C & 16C Dose-response to atrazine in the Warmbad A and Warmbad B soils

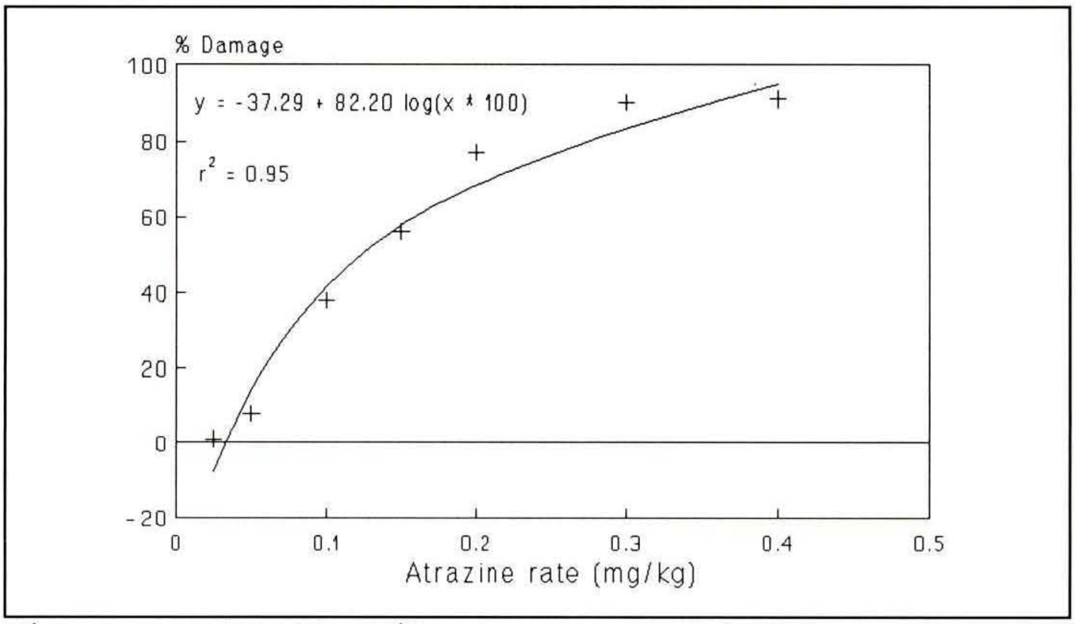

Fig. 17c Utrecht soil

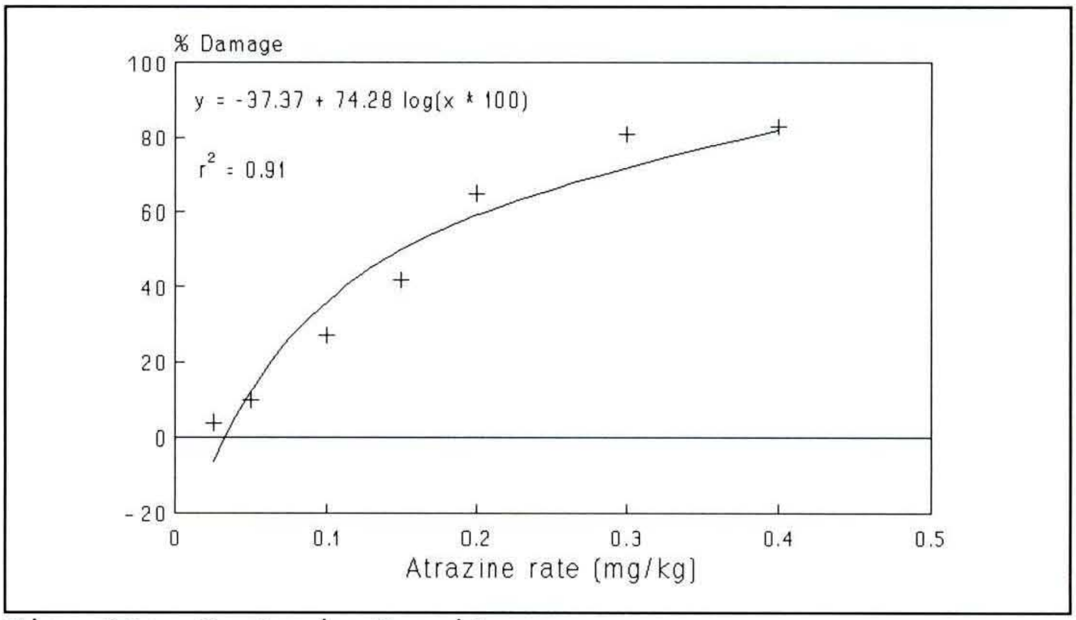

Fig. 18c Pretoria B soil

Figures 17C & 18C Dose-response to atrazine in the Utrecht and Pretoria B soils

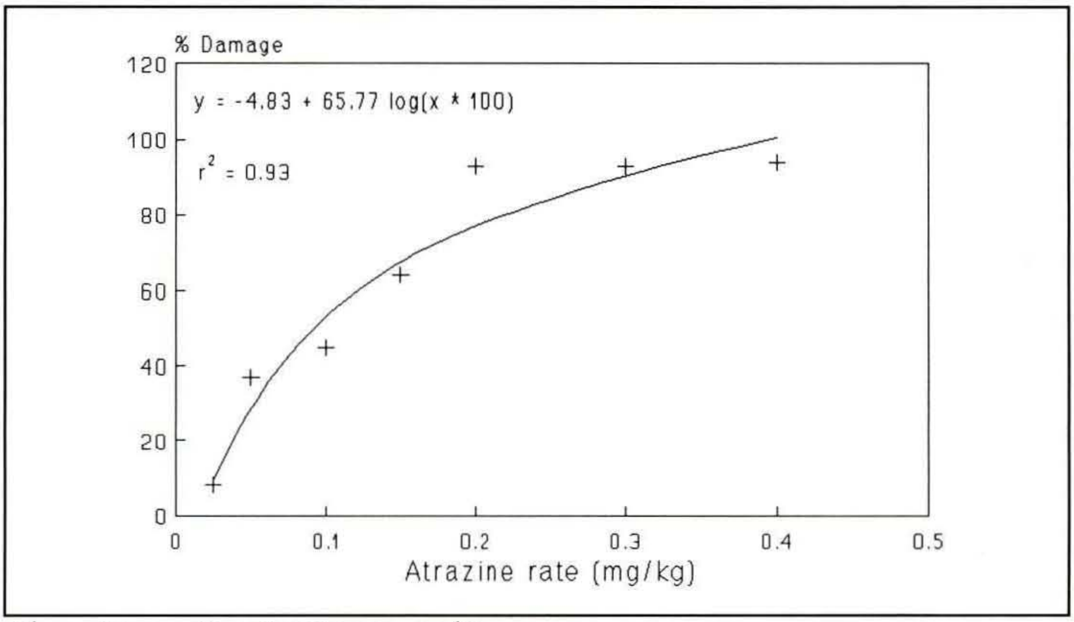

Fig. 19c Roodeplaat soil

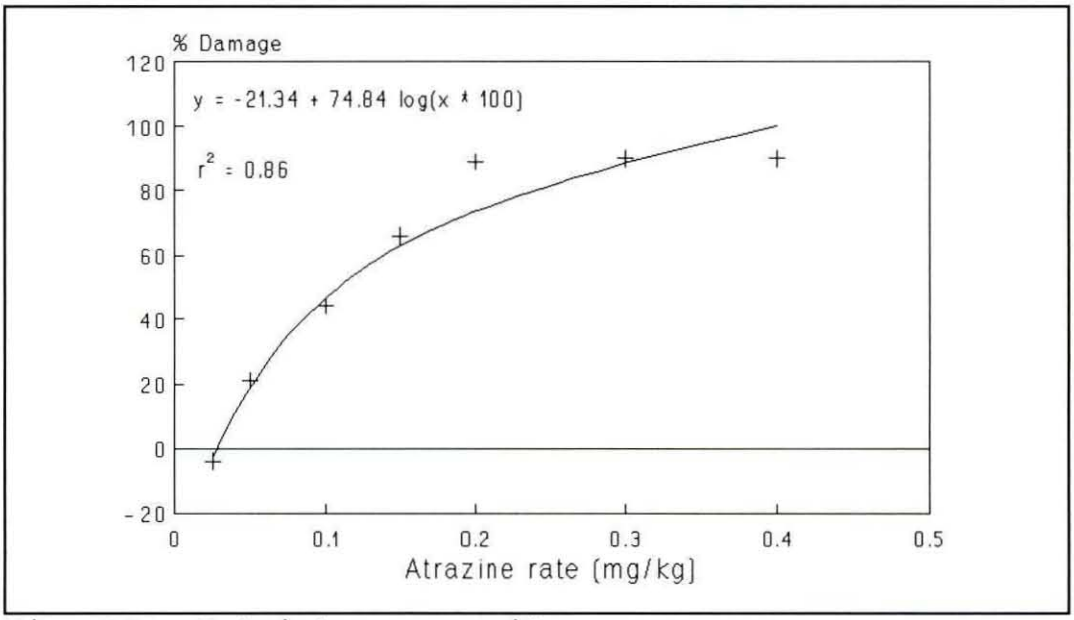

Fig. 20c Potgietersrus soil

Figures 19C & 20C Dose-response to atrazine in the Roodeplaat and Potgietersrus soils

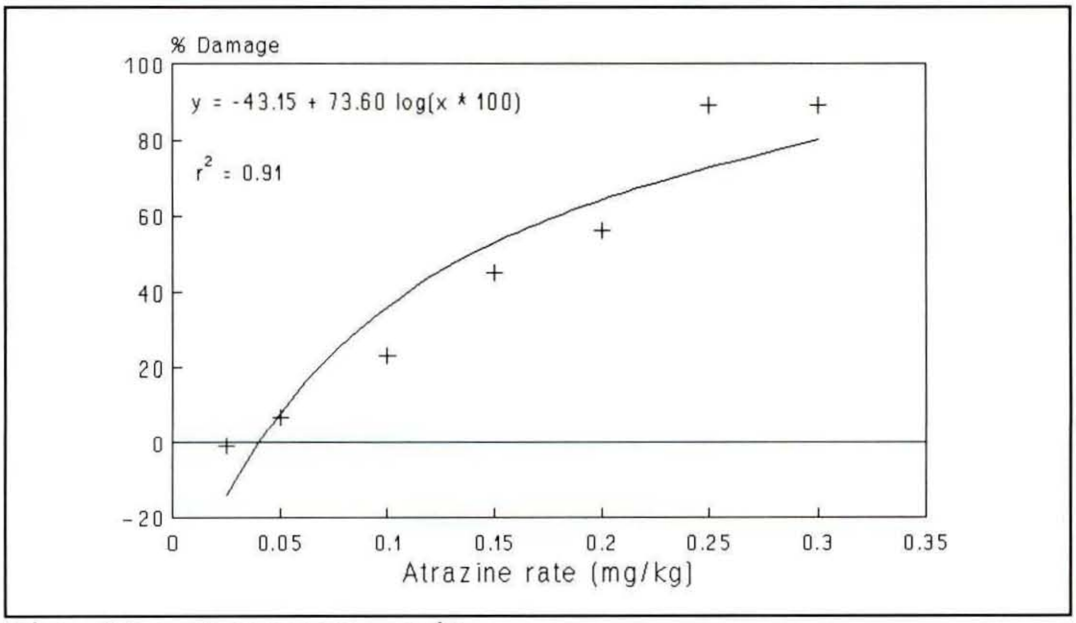

Fig. 21c Morgenzon soil

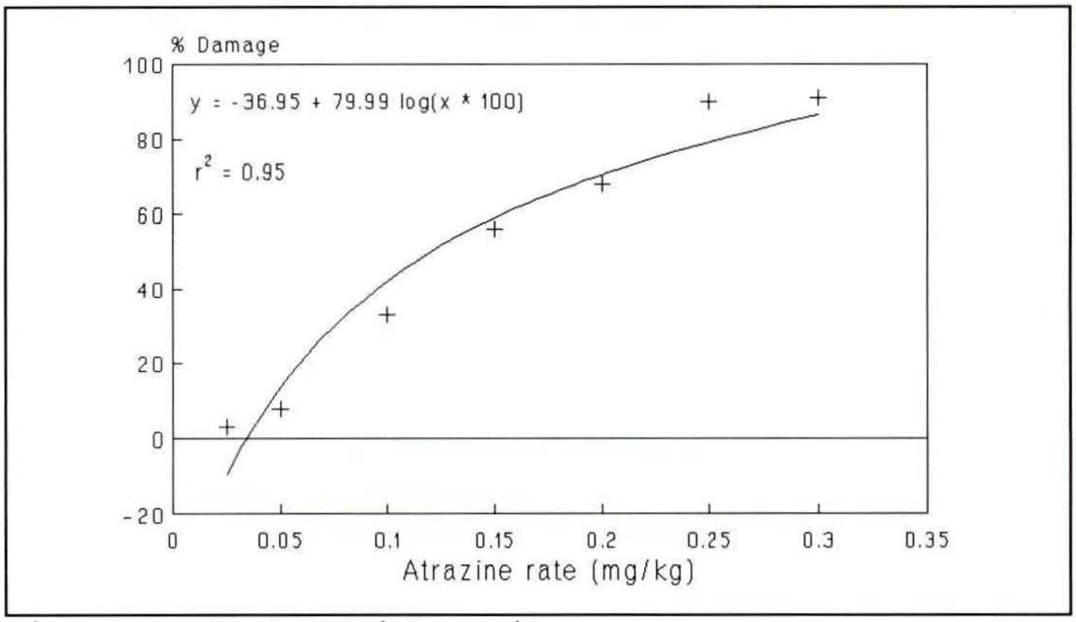

Fig. 22c Carletonville soil

Figures 21C & 22C Dose-response to atrazine in the Morgenzon and Carletonville soils

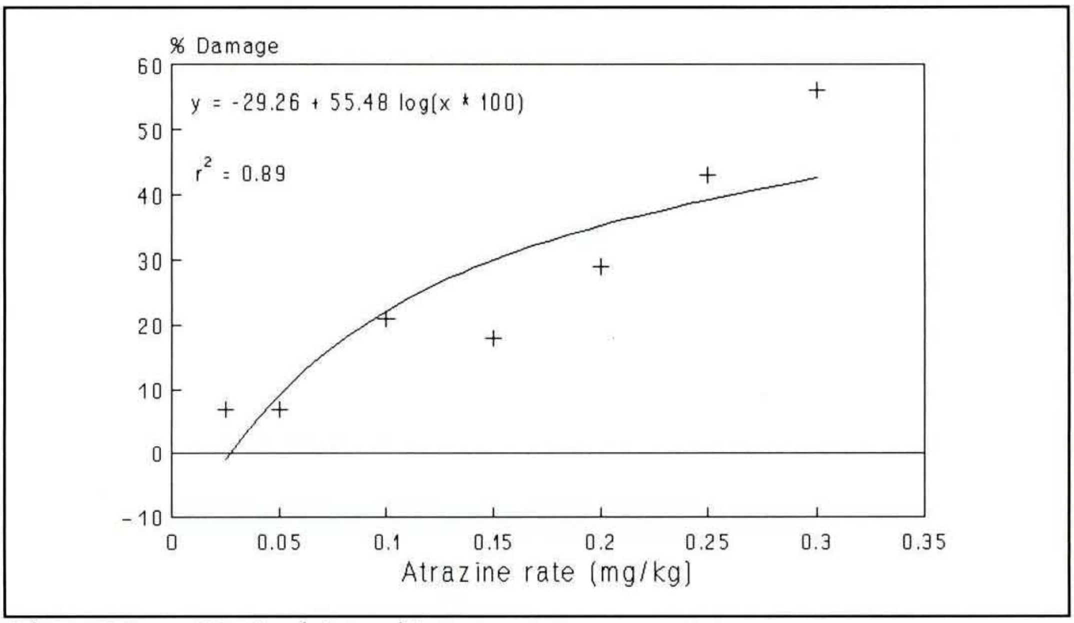

Fig. 23c Vryheid soil

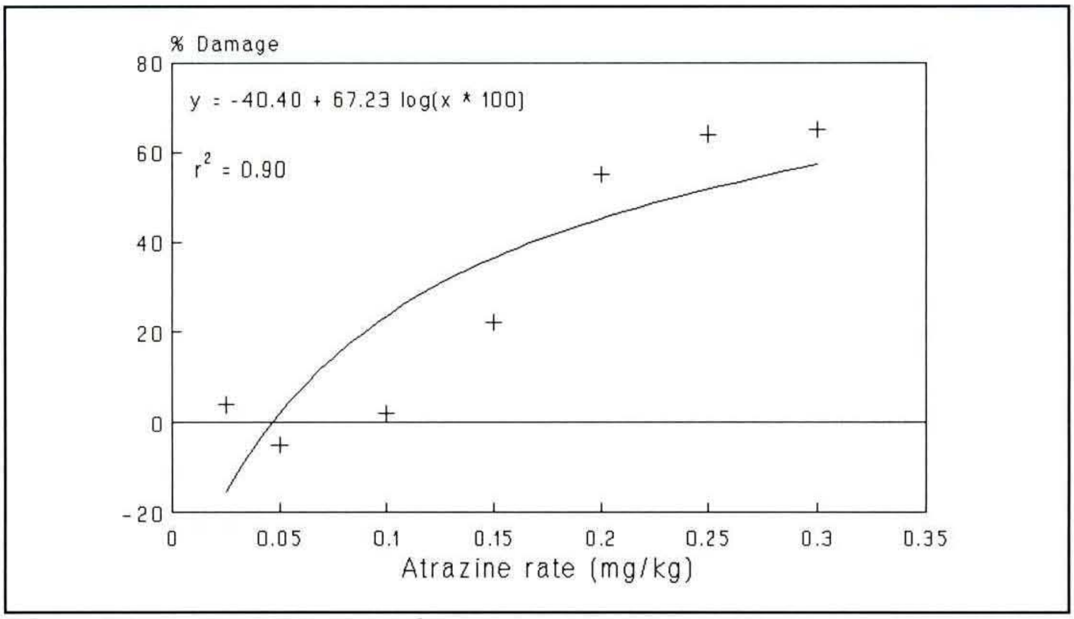

Fig. 24c Ermelo B soil

Figures 23C & 24C Dose-response to atrazine in the Vryheid and Ermelo B soils

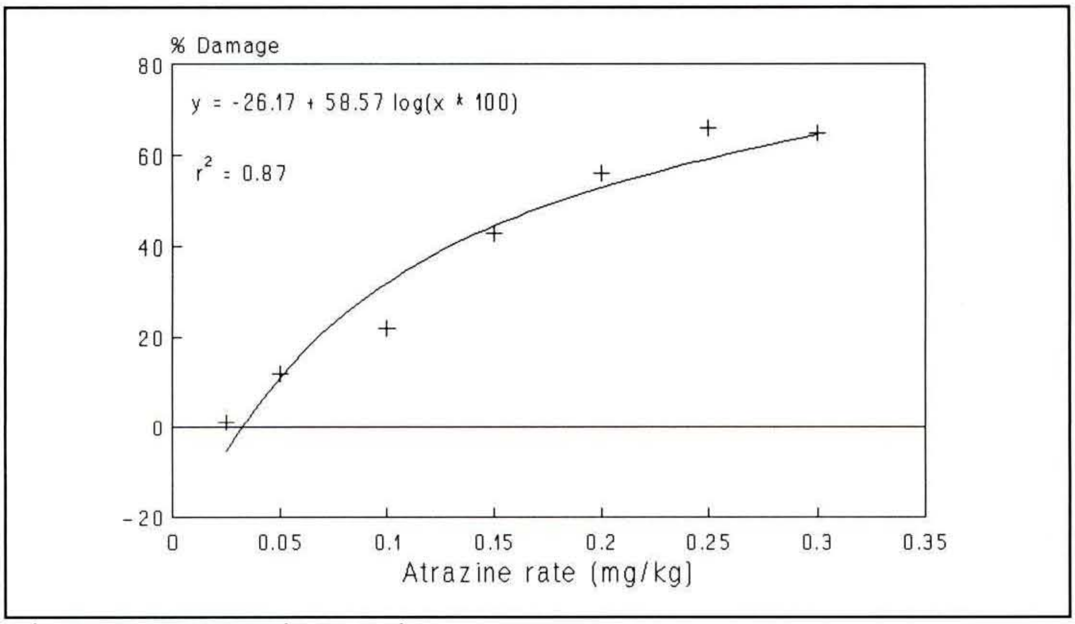

Fig. 25c Redhill soil

Figure 25C Dose-response to atrazine in the Redhill soil