



APPENDICES

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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Appendix A 1

Summarized data of Oak (*Q. robur*)

Table displays summarized results of visual observations on Oak for April 20th and May 5th

Rating of Oak trees												
Option	Date	Tree number	OPM yes/no	OPM processing	OPM single count	Total OPM count/Tree	Nest number	Nest length	Nest width	Nest depth	Nest volume in cm ³	Total nest Volume/Tree
treated 0 times	20.04.2011	56	no									
treated 0 times	20.04.2011	55	no									
treated 0 times	20.04.2011	54	no									
control	20.04.2011	52	no									
control	20.04.2011	51	no									
control	20.04.2011	50	no									
treated 0 times	20.04.2011	48	no									
treated 0 times	20.04.2011	47	no									
treated 0 times	20.04.2011	46	no									
treated 0 times	20.04.2011	45	no									
control	20.04.2011	44	no									
control	20.04.2011	43	no									
control	20.04.2011	42	no									
control	20.04.2011	41	no									
treated 1 times	05.05.2011	56	no									
treated 1 times	05.05.2011	55	yes		100		1					
treated 1 times	05.05.2011	55	yes		80	180	2					
treated 1 times	05.05.2011	54	no									
control	05.05.2011	52	no									
control	05.05.2011	51	no									
control	05.05.2011	50	no									
treated 1 times	05.05.2011	48	no									
treated 1 times	05.05.2011	47	yes	x	100		1					
treated 1 times	05.05.2011	47	yes		100		2					
treated 1 times	05.05.2011	47	yes		80		3					
treated 1 times	05.05.2011	47	yes		50	330	4					
treated 1 times	05.05.2011	46	no									
treated 1 times	05.05.2011	45	no									
control	05.05.2011	44	no									
control	05.05.2011	43	no									
control	05.05.2011	42	no									
control	05.05.2011	41	no									

Table displays summarized results of visual observations on Oak for May 13th

Rating of Oak trees												
Option	Date	Tree number	OPM yes/no	OPM processing	OPM single count	Total OPM count/Tree	Nest number	Nest length	Nest width	Nest depth	Nest volume in cm ³	Total nest Volume/Tree
treated 2 times	13.05.2011	56	no									
treated 2 times	13.05.2011	55	yes				1	20	10	5	1000	1000
treated 2 times	13.05.2011	54	no									
control	13.05.2011	52	yes	x	130	130	1					
control	13.05.2011	51	yes				1	10	10	2	200	
control	13.05.2011	51	yes				2	10	10	5	500	
control	13.05.2011	51	yes				3	10	10	2	200	900
control	13.05.2011	50	yes	x	100	100	1					
control	13.05.2011	50	yes				2	10	10	5	500	500
treated 2 times	13.05.2011	48	yes	x	200	200	1					
treated 2 times	13.05.2011	48	yes				2	15	10	5	750	750
treated 2 times	13.05.2011	47	yes				1	5	10	1	50	
treated 2 times	13.05.2011	47	yes				2	15	10	1	150	
treated 2 times	13.05.2011	47	yes				3	10	6	1	60	260
treated 2 times	13.05.2011	46	no									
treated 2 times	13.05.2011	45	yes	x	200	200	1					
control	13.05.2011	44	yes				1	20	10	5	1000	
control	13.05.2011	44	yes				2	20	10	5	1000	
control	13.05.2011	44	yes				3	6	8	1	48	
control	13.05.2011	44	yes				4	10	5	2	100	2148
control	13.05.2011	43	yes	x	300	300	1					
control	13.05.2011	43	yes				2	25	10	6	1500	1500
control	13.05.2011	42	yes	x	100	100	1					
control	13.05.2011	42	yes				2	10	5	1	50	
control	13.05.2011	42	yes				3	10	5	1	50	100
control	13.05.2011	41	yes				1	15	10	5	750	750

Table displays summarized results of visual observations on Oak for May 25th

Rating of Oak trees												
Option	Date	Tree number	OPM yes/no	OPM processing	OPM single count	Total OPM count/Tree	Nest number	Nest length	Nest width	Nest depth	Nest volume in cm ³	Total nest Volume/Tree
treated 2 times	18.05.2011	56	no									
treated 2 times	18.05.2011	55	yes		9		1					
treated 2 times	18.05.2011	55	yes		20	29	2					
treated 2 times	18.05.2011	55	yes				3	25	10	5	1250	1250
treated 2 times	18.05.2011	54	no									
control	18.05.2011	52	yes				1	25	15	5	1875	1875
control	18.05.2011	51	yes				1	25	15	2	750	
control	18.05.2011	51	yes				2	20	10	5	1000	
control	18.05.2011	51	yes				3	10	10	3	300	
control	18.05.2011	51	yes				4	10	5	2	100	2150
control	18.05.2011	50	yes				1	10	5	5	250	
control	18.05.2011	50	yes				2	20	20	5	2000	2250
treated 2 times	18.05.2011	48	yes		20	20	1					
treated 2 times	18.05.2011	48	yes				2	15	10	2	300	
treated 2 times	18.05.2011	48	yes				3	35	15	5	2625	
treated 2 times	18.05.2011	48	yes				4	15	10	5	750	
treated 2 times	18.05.2011	48	yes				5	20	10	3	600	4275
treated 2 times	18.05.2011	47	yes				1	25	10	3	750	
treated 2 times	18.05.2011	47	yes				2	20	10	2	400	
treated 2 times	18.05.2011	47	yes				3	5	5	2	50	1200
treated 2 times	18.05.2011	46	yes				1	20	20	5	2000	2000
treated 2 times	18.05.2011	45	yes				1	30	10	2	600	600
control	18.05.2011	44	yes				1	20	10	5	1000	
control	18.05.2011	44	yes				2	20	10	5	1000	
control	18.05.2011	44	yes				3	25	15	3	1125	
control	18.05.2011	44	yes				4	10	5	2	100	3225
control	18.05.2011	43	yes				1	10	5	3	150	
control	18.05.2011	43	yes				2	12	10	5	600	
control	18.05.2011	43	yes				3	25	10	7	1750	
control	18.05.2011	43	yes				4	25	15	10	3750	
control	18.05.2011	43	yes				5	15	7	5	525	
control	18.05.2011	43	yes				6	10	5	2	100	6875
control	18.05.2011	42	no									
control	18.05.2011	41	yes				1	15	10	2	300	
control	18.05.2011	41	yes				2	15	10	5	750	
control	18.05.2011	41	yes				3	20	10	2	400	1450

Table displays summarized results of visual leaf assessment on Oak for May 25th

Visual leaf assessment (VLA)				Number of leaves with damage							
on Oak (<i>Quercus robur</i>)											
Date	Tree #	Canopy place	Option	marginal feeding	hole feeding	dead spots	leaf mines	sucking damage	other insects	leaves free of damage	
May, 25	46	center	treated	3	6	2				10 of 19	
May, 25	46	lower	treated	5	2					12 of 18	
May, 25	47	center	treated	5	1					11 of 16	
May, 25	47	lower	treated	9	2	1				6 of 15	
May, 25	48	center	treated	4	1	3		1		9 of 16	
May, 25	48	lower	treated	3	2	2				10 of 14	
May, 25	41	center	control	10	3				1	6 of 17	
May, 25	41	lower	control	4	2		1	1		16 of 23	
May, 25	43	center	control	3	5				1	13 of 21	
May, 25	43	lower	control	3	5			1	1	2 of 11	
May, 25	44	center	control	2	3			5		10 of 16	
May, 25	44	lower	control	6	4			1		10 of 19	
		Total	treated	29	14	8	0	1	0	58 of 98	
			control	28	22	0	1	8	3	57 of 107	

Appendix A 2

Summarized data of Sycamore (*P. x hispanica*)

Table displays summarized results of visual leaf assessment on Sycamore for May 25th

Visual leaf assessment (VLA) on Sycamore (<i>Platanus x hispanica</i>)				Number of leaves with damage							
Date	Tree #	Canopy place	Option	marginal feeding	hole feeding	leaf spots	leaf mines	sucking damage	other insects	leaf vein fungus	leaves free of damage
May, 25	90	center	treated		2						15 of 17
May, 25	90	lower	treated			1	1			1	8 of 11
May, 25	92	center	treated	1	1		3			3	5 of 13
May, 25	92	lower	treated			5	1				5 of 12
May, 25	108	center	treated							2	12 of 14
May, 25	108	lower	treated		2	1				3	7 of 12
May, 25	97	center	control	1			1			1	3 of 15
May, 25	97	lower	control				4			2	7 of 14
May, 25	98	center	control				8			2	6 of 16
May, 25	98	lower	control		2	2	9			1	4 of 15
May, 25	101	center	control	1	1		5				10 of 15
May, 25	101	lower	control	2	2		2			1	7 of 13
		Total	treated	1	5	7	5	0	0	9	52 of 79
			control	4	5	2	29	0	0	7	37 of 88

Table displays summarized results of visual leaf assessment on Sycamore for June 22nd

Visual leaf assessment (VLA) on Sycamore (<i>Platanus x hispanica</i>)				Number of leaves with damage							
Date	Tree #	Canopy place	Option	marginal feeding	hole feeding	leaf spots	leaf mines	sucking damage	other insects	leaf vein fungus	leaves free of damage
June, 22	90	top	treated		2			1			7 of 10
June, 22	90	center	treated		1					3	9 of 13
June, 22	90	lower	treated				4			1	7 of 11
June, 22	91	top	treated	2	1		2			1	5 of 11
June, 22	91	center	treated	2	1		4			3	4 of 11
June, 22	91	lower	treated	1		6	4				5 of 12
June, 22	109	top	treated	2		4				2	4 of 12
June, 22	109	center	treated		2	2	1			4	4 of 12
June, 22	109	lower	treated			1	6				4 of 11
June, 22	98	top	control	1	2		5			2	4 of 12
June, 22	98	center	control				6			2	4 of 11
June, 22	98	lower	control	1	1		8			2	1 of 11
June, 22	101	top	control	1	1	2	4			2	2 of 11
June, 22	101	center	control	1	2		2			6	4 of 12
June, 22	101	lower	control		1	1	10			2	0 of 12
June, 22	104	top	control		2	1	2			3	4 of 11
June, 22	104	center	control		1		3				7 of 11
June, 22	104	lower	control	1	2		6			1	3 of 11
		Total	treated	7	7	13	21	1	0	14	49 of 103
			control	5	12	4	46	0	0	20	29 of 102

Appendix A 3

Summarized data of Horse chestnut (*A. hippocastanum*)

Table displays summarized results from visual observation on Horse chestnut

Rating of Horse Chestnut							
Option	Date	Tree #	HCL % of tot leaves	Leaf damage from NeemAzal	Salt damage	hail damage	Leaf-end roll
Control	01.07.2011	73	15				
Control	01.07.2011	72	15				
Control	01.07.2011	71	15				
Control	01.07.2011	70	15	x			
Treated 4 times	01.07.2011	69	15				
Treated 4 times	01.07.2011	68	15	x			
Treated 4 times	01.07.2011	67	15				
Treated 4 times	01.07.2011	66	15				
Treated 4 times	01.07.2011	65	15	x	x		
Treated 4 times	01.07.2011	64	15				
Control	01.07.2011	63	15				
Control	01.07.2011	62	15				
Control	05.07.2011	73	15		x		
Control	05.07.2011	72	15		x		
Control	05.07.2011	71	15				
Control	05.07.2011	70	15	x	x		
Treated 4 times	05.07.2011	69	15				
Treated 4 times	05.07.2011	68	15	x			
Treated 4 times	05.07.2011	67	15				
Treated 4 times	05.07.2011	66	15				
Treated 4 times	05.07.2011	65	15	x			
Treated 4 times	05.07.2011	64	15	x			
Control	05.07.2011	63	15				
Control	05.07.2011	62	15		x		

Table displays summarized results from visual observation on Horse chestnut

Control	08.07.2011	73	15		x		
Control	08.07.2011	72	15		x		
Control	08.07.2011	71	15				
Control	08.07.2011	70	15	x	x		
Treated 4 times	08.07.2011	69	15				
Treated 4 times	08.07.2011	68	15	x			
Treated 4 times	08.07.2011	67	15				
Treated 4 times	08.07.2011	66	15				
Treated 4 times	08.07.2011	65	15	x			
Treated 4 times	08.07.2011	64	15	x			
Control	08.07.2011	63	15				
Control	08.07.2011	62	15		x		
Control	12.07.2011	73	15		x		
Control	12.07.2011	72	15		x		
Control	12.07.2011	71	15				
Control	12.07.2011	70	15	x	x		
Treated 4 times	12.07.2011	69	15				
Treated 4 times	12.07.2011	68	15	x			
Treated 4 times	12.07.2011	67	15				
Treated 4 times	12.07.2011	66	15				
Treated 4 times	12.07.2011	65	15	x			
Treated 4 times	12.07.2011	64	15	x			
Control	12.07.2011	63	15				
Control	12.07.2011	62	15		x		

Table displays summarized results from visual observation on Horse chestnut

Rating of Horse Chestnut			HCL %	Leaf damage	Salt	hail	Leaf-end
Option	Date	Tree #	of tot leaves	from NeemAzal	damage	damage	roll
Control	19.07.2011	73	20		x	x	
Control	19.07.2011	72	20		x	x	
Control	19.07.2011	71	20			x	
Control	19.07.2011	70	20	x	x	x	
Treated 5 times	19.07.2011	69	20			x	
Treated 5 times	19.07.2011	68	20	x		x	
Treated 5 times	19.07.2011	67	20			x	
Treated 5 times	19.07.2011	66	15			x	
Treated 5 times	19.07.2011	65	15	x		x	
Treated 5 times	19.07.2011	64	15	x		x	
Control	19.07.2011	63	15			x	
Control	19.07.2011	62	15		x	x	
Control	26.07.2011	73	20		x	x	x
Control	26.07.2011	72	20		x	x	x
Control	26.07.2011	71	20			x	x
Control	26.07.2011	70	20	x	x	x	x
Treated 5 times	26.07.2011	69	20			x	x
Treated 5 times	26.07.2011	68	20	x		x	x
Treated 5 times	26.07.2011	67	20			x	x
Treated 5 times	26.07.2011	66	15			x	x
Treated 5 times	26.07.2011	65	15	x		x	x
Treated 5 times	26.07.2011	64	15	x		x	x
Control	26.07.2011	63	15			x	x
Control	26.07.2011	62	15		x	x	x
Control	01.08.2011	73	20		x	x	x
Control	01.08.2011	72	20		x	x	x
Control	01.08.2011	71	20			x	x
Control	01.08.2011	70	20	x	x	x	x
Treated 5 times	01.08.2011	69	20			x	x
Treated 5 times	01.08.2011	68	20	x		x	x
Treated 5 times	01.08.2011	67	20			x	x
Treated 5 times	01.08.2011	66	15			x	x
Treated 5 times	01.08.2011	65	15	x		x	x
Treated 5 times	01.08.2011	64	15	x		x	x
Control	01.08.2011	63	15			x	x
Control	01.08.2011	62	15		x	x	x

Table displays average values of Horse chestnut leaves from May 25th

Chestnut leaf analysis, May 25, after 1 application of NeemAzal-T/S					
Average numbers of following parameters:					
CONTROL					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
63	center	4,33	30,38	131,67	0,37
63	lower	7,67	30,13	231,00	0,39
70	center	14,33	31,77	455,33	0,42
70	lower	5,33	23,19	123,67	0,41
73	center	6,00	13,06	78,33	0,44
73	lower	9,00	42,04	378,33	0,52
Total of 18 leaves		7,78	28,43	233,05	0,43
TREATED					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
65	center	1,00	31,67	31,67	0,38
65	lower	6,33	9,26	58,67	0,26
66	center	3,67	18,00	66,00	0,24
66	lower	20,33	31,54	641,33	0,40
69	center	9,33	49,54	462,33	0,40
69	lower	18,00	32,65	587,67	0,35
Total of 18 leaves		9,78	28,78	307,95	0,34

Table displays average values of Horse chestnut leaves from June 22nd

Chestnut leaf analysis, June 22, after 3 applications of NeemAzal-T/S					
Average numbers of following parameters:					
CONTROL					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
70	top	2,33	286,86	669,33	0,56
70	center	2,00	234,67	469,33	0,53
70	lower	2,67	353,00	941,33	0,49
71	top	1,33	304,50	406,00	0,54
71	center	1,33	227,50	303,33	0,58
71	lower	4,67	142,50	665,00	0,46
72	top	6,67	719,65	827,00	0,51
72	center	4,67	173,14	808,00	0,56
72	lower	4,33	197,00	853,67	0,51
Total of 27 leaves		3,33	293,20	660,33	0,53

TREATED					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
65	top	1,33	156,00	208,00	0,58
65	center	1,00	318,00	318,00	0,57
65	lower	3,00	149,44	448,33	0,48
67	top	1,00	148,00	148,00	0,49
67	center	2,00	167,83	335,67	0,52
67	lower	5,33	192,56	1027,00	0,49
68	top	3,00	129,00	387,00	0,55
68	center	6,33	691,83	1089,33	0,49
68	lower	12,33	190,92	2354,67	0,53
Total of 27 leaves		3,92	238,18	701,78	0,52

Table displays average values of Horse chestnut leaves from July 19th

Chestnut leaf analysis, July 19, after 5 applications of NeemAzal-T/S					
Average numbers of following parameters:					
CONTROL					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
62	top	18,67	25,04	467,33	0,28
62	center	22,67	23,47	532,00	0,26
62	lower	49,33	58,75	2898,33	0,32
70	top	5,33	42,00	224,00	0,22
70	center	10,00	29,27	292,67	0,28
70	lower	25,67	60,60	1555,33	0,32
72	top	23,00	19,19	441,33	0,28
72	center	25,67	20,64	529,67	0,25
72	lower	22,67	62,47	1416,00	0,38
Total of 27 leaves		22,56	37,94	928,52	0,29

TREATED					
Tree #	Canopy place	Number of Mines	Mine area in mm ²	Total mine area per leaf in mm ²	Head capsule in mm
64	top	24,33	13,77	335,00	0,26
64	center	14,00	15,17	212,33	0,27
64	lower	19,00	46,56	884,67	0,28
66	top	12,33	38,84	479,00	0,23
66	center	16,67	44,64	878,00	0,26
66	lower	13,67	49,32	674,00	0,29
69	top	19,67	27,56	542,00	0,29
69	center	19,00	59,53	1131,00	0,29
69	lower	19,67	51,64	1015,67	0,31
Total of 27 leaves		17,59	38,56	683,52	0,28

Table displays total values of Horse chestnut leaves from May 25th

Horse Chestnut leaf analysis from Mai 25, 2011 after 1 NeemAzal-T/S application												
Leaf analysis on Horse Chestnut - CONTROL												
tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
63	center	13	395	2	2						2	
63	lower	23	693	6	6						6	
63	total	36	1088	8	8						8	
70	center	43	1366	10	10						10	
70	lower	16	371	13	13						13	
70	total	59	1737	23	23						23	
73	center	18	235	4	4						4	
73	lower	27	1135	10	10						10	
73	total	45	1370	14	14						14	
TOTAL of 18 leaves		140	4195	45	45	0	0	0	0	0	45	0
			Prozent %	32,14	32,14	0,00	0,00	0,00	0,00	0,00	32,14	0,00
Leaf analysis on Horse Chestnut - TREATED												
tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
65	center	3	95	2	2						2	
65	lower	19	176	15	15						15	
65	total	22	271	17	17						17	
66	center	11	198	8	8						8	
66	lower	61	1924	51	51						51	
66	total	72	2122	59	59						59	
69	center	28	1387	17	17						17	
69	lower	54	1763	48	48						48	
69	total	82	3150	65	65						65	
TOTAL of 18 leaves		176	5543	141	141	0	0	0	0	0	141	0
			Prozent %	80,11	80,11	0,00	0,00	0,00	0,00	0,00	80,11	0,00

Table displays total values of Horse chestnut leaves from June 22nd

Horse Chestnut leaf analysis from June 22, 2011 after 3 NeemAzal-T/S applications												
tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
70	top	7	2008	7			2			5	7	0
70	center	6	1408	6	1					5	6	0
70	lower	8	2824	8	3	1	2			2	6	1
70	total	21	6240	21	4	1	4	0	0	12	19	1
71	top	4	1218	4			1			3	4	0
71	center	4	910	4		1	2			1	3	0
71	lower	14	1995	14	7	2	1			4	10	2
71	total	22	4123	22	7	3	4	0	0	8	17	2
72	top	20	2481	20	5	1	2	1		11	19	0
72	center	14	2424	14	1		1			12	14	0
72	lower	13	2561	13	2		7	1		4	13	0
72	total	47	7466	47	8	1	10	2	0	27	46	0
TOTAL of 27 leaves		90	17829	90	19	5	18	2	0	47	82	3
			Prozent %	100,00	21,11	5,56	20,00	2,22	0,00	52,22	91,11	3,33

tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
65	top	4	624	4	1		2			1	4	0
65	center	3	954	3	1		1			1	3	0
65	lower	9	1345	9	3		2	1		3	8	1
65	total	16	2923	16	5	0	5	1	0	5	15	1
67	top	3	444	3	1					2	2	1
67	center	6	1007	6			3	1		2	6	0
67	lower	16	3081	16	6		2			8	16	0
67	total	25	4532	25	7	0	5	1	0	12	24	1
68	top	9	1161	9	1	1	5			2	8	0
68	center	19	3268	19	5	4	4	1		5	14	1
68	lower	37	7064	37	9	3	16			9	32	2
68	total	65	11493	65	15	8	25	1	0	16	54	3
TOTAL of 27 leaves		106	18948	106	27	8	35	3	0	33	93	5
			Prozent %	100,00	25,47	7,55	33,02	2,83	0,00	31,13	87,74	4,72

Table displays total values of Horse chestnut leaves from July 19th

Horse Chestnut leaf analysis from July 19, 2011 after 5 NeemAzal-T/S applications												
tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
62	top	56	1402	56	42	7			1	6	7	41
62	center	68	1596	68	53	8				7	10	50
62	lower	148	8695	148	83	21			1	43	50	76
62	total	272	11693	272	178	36	0	0	2	56	67	167
70	top	16	672	16	12	1				3	3	12
70	center	30	878	30	18	9				3	5	16
70	lower	77	4666	77	48	11	1			17	22	44
70	total	123	6216	123	78	21	1	0	0	23	30	72
72	top	69	1324	69	50	10			2	7	7	50
72	center	77	1589	77	57	9			4	7	9	55
72	lower	68	4248	68	51	2			3	12	24	39
72	total	214	7161	214	158	21	0	0	9	26	40	144
TOTAL of 27 leaves		609	25070	609	414	78	1	0	11	105	137	383
			Prozent %	100,00	67,98	12,81	0,16	0,00	1,81	17,24	22,50	62,89
tree #	place in canopy	total mines	total mine area per canopy place in mm ²	total beings	larva	no larva found	pupa	parasitic larva/pupa	not to measure	old mine la. hatched	Gen I.	Gen II.
64	top	73	1005	73	62	3	1		3	4	5	62
64	center	42	637	42	33	7	1		1	1	1	33
64	lower	57	2654	57	48	1	2		1	5	11	44
64	total	172	4296	172	143	11	4	0	5	9	17	139
66	top	37	1437	37	25	4			3	5	6	24
66	center	59	2634	59	38	5			2	14	14	38
66	lower	41	2022	41	30	5			1	5	9	26
66	total	137	6093	137	93	14	0	0	6	24	29	88
69	top	59	1626	59	44	7			1	7	10	41
69	center	57	3393	57	31	7			3	16	19	28
69	lower	59	3047	59	40	3			1	15	17	38
69	total	175	8066	175	115	17	0	0	5	38	46	107
TOTAL of 27 leaves		484	18455	484	351	42	4	0	16	71	92	334
			Prozent %	100,00	72,52	8,68	0,83	0,00	3,31	14,67	19,01	69,01

Table displays categories of infestation on Horse chestnut

May 25th

Chestnut leaf analysis from May 25, after 1 treatment with NeemAzal-T/S

Leaf analysis CONTROL

Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
63	center	13	9	1	2	1	0
63	lower	23	10	9	3	1	0
63	total	36	19	10	5	2	0
70	center	43	25	10	5	3	0
70	lower	16	9	5	2	0	0
70	total	59	34	15	7	3	0
73	center	18	14	3	1	0	0
73	lower	27	14	4	6	3	0
73	total	45	28	7	7	3	0
TOTAL of 18 leaves		140	81	32	19	8	0
		%	57,86	22,86	13,57	5,71	0,00

June 22nd

Chestnut leaf analysis from June 22, after 3 treatments with NeemAzal-T/S

Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
70	top	7	0	0	0	4	3
70	center	6	0	0	0	4	2
70	lower	8	2	0	0	0	6
70	total	21	2	0	0	8	11
71	top	4	0	0	0	1	3
71	center	4	0	1	0	0	3
71	lower	14	1	2	1	8	2
71	total	22	1	3	1	9	8
72	top	20	1	0	7	12	0
72	center	14	0	0	3	8	3
72	lower	13	0	0	0	12	1
72	total	47	1	0	10	32	4
TOTAL of 27 leaves		90	4	3	11	49	23
		%	4,44	3,33	12,22	54,44	25,56

July 19th

Chestnut leaf analysis from July 19, after 5 treatments with NeemAzal-T/S

Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
62	top	56	39	9	3	5	0
62	center	68	55	3	4	6	0
62	lower	148	85	11	11	38	3
62	total	272	179	23	18	49	3
70	top	16	13	0	0	2	1
70	center	30	23	1	3	2	1
70	lower	77	50	4	5	16	2
70	total	123	86	5	8	20	4
72	top	69	54	7	3	5	0
72	center	77	64	2	4	7	0
72	lower	68	30	12	8	16	2
72	total	214	148	21	15	28	2
TOTAL of 27 leaves		609	413	49	41	97	9
		%	67,82	8,05	6,73	15,93	1,48

Leaf analysis TREATED							
Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
65	center	3	2	0	1	0	0
65	lower	19	17	1	1	0	0
65	total	22	19	1	2	0	0
66	center	11	8	2	1	0	0
66	lower	61	30	20	8	3	0
66	total	72	38	22	9	3	0
69	center	28	18	1	3	6	0
69	lower	54	33	10	5	6	0
69	total	82	51	11	8	12	0
TOTAL of 18 leaves		176	108	34	19	15	0
		%	61,36	19,32	10,8	8,52	0,00

Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
65	top	4	0	0	0	4	0
65	center	3	0	0	0	1	2
65	lower	9	0	0	1	8	0
65	total	16	0	0	1	13	2
67	top	3	0	1	0	2	0
67	center	6	0	1	0	4	1
67	lower	16	0	0	0	14	2
67	total	25	0	2	0	20	3
68	top	9	0	1	1	7	0
68	center	19	2	0	1	13	3
68	lower	37	1	1	1	26	8
68	total	65	3	2	3	46	11
TOTAL of 27 leaves		106	3	4	4	79	16
		%	2,83	3,77	3,77	74,53	15,09

Tree #	Canopy place	Number of mines	Categories of infestation				
			1	2	3	4	5
64	top	73	66	1	2	4	0
64	center	42	38	2	0	2	0
64	lower	57	43	3	1	6	4
64	total	172	147	6	3	12	4
66	top	37	28	2	1	5	1
66	center	59	41	3	4	10	1
66	lower	41	29	2	3	6	1
66	total	137	98	7	8	21	3
69	top	59	47	2	2	8	0
69	center	57	31	7	3	14	2
69	lower	59	35	6	1	17	0
69	total	175	113	15	6	39	2
TOTAL of 27 leaves		484	358	28	17	72	9
		%	73,97	5,79	3,51	14,88	1,86

Table displays data of HCL pest occurrence monitored with pheromone traps

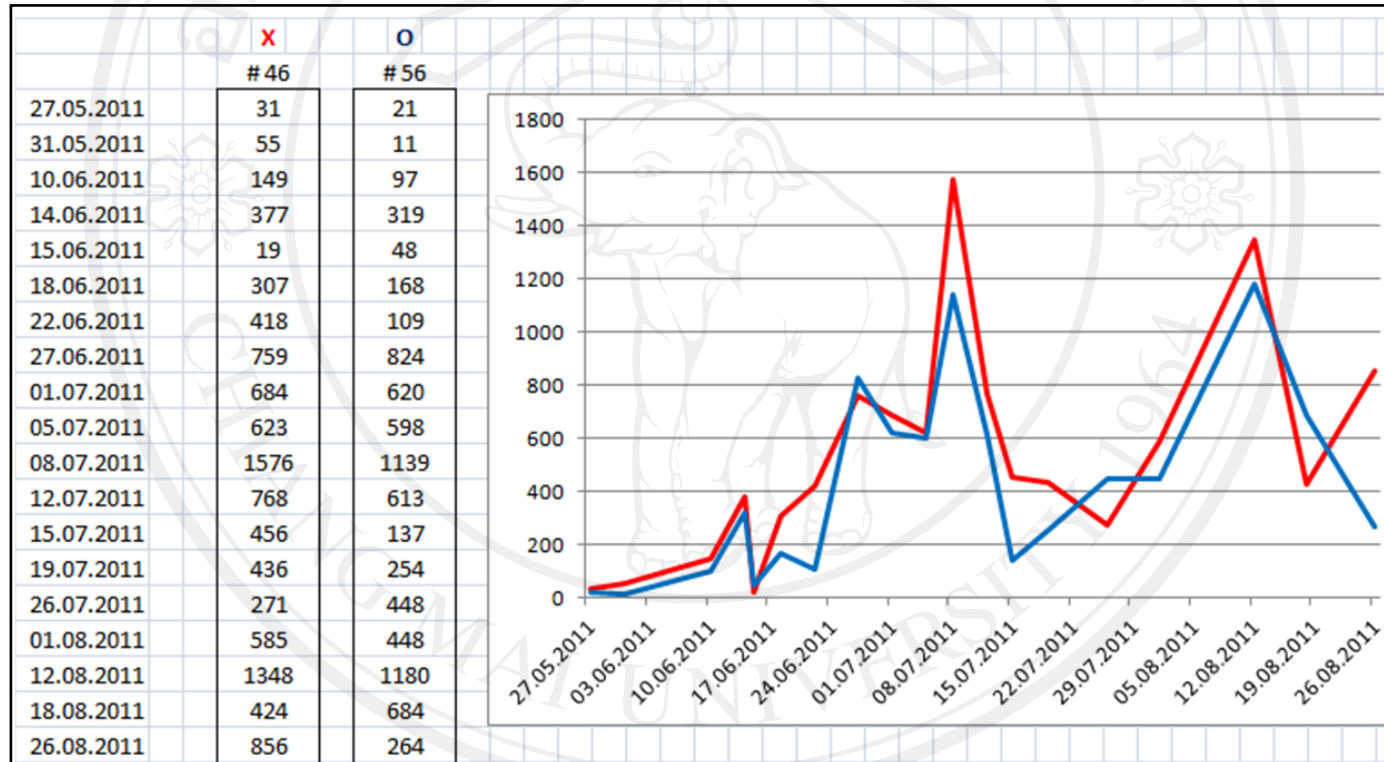


Table displays data of leaf surface analysis including steps of calculation

Date	Option	Tree#	Canopy	Brutto	Correction	Difference	Difference	Brutto - Ink (80%)	Leaf area	Leaf area	Leaf area	Mine area	% Mine area
			place	Leaf weight	Ink (1,045)	100% (Ink)	80% (Ink)	real Leaf weight	in m ²	in cm ²	in mm ²	in mm ²	of Leaf area
25. Mai	C	70	C	14,970	15,64365	0,67365	0,53892	14,43108	0,1803885	1803,885	180388,50	1366	0,757
25. Mai	C	70	L	12,470	13,03115	0,56115	0,44892	12,02108	0,1502635	1502,635	150263,50	371	0,247
25. Mai	T	66	C	8,101	8,465545	0,364545	0,291636	7,809364	0,09761705	976,1705	97617,05	198	0,203
25. Mai	T	66	L	10,630	11,10835	0,47835	0,38268	10,24732	0,1280915	1280,915	128091,50	1924	1,502
22. Jun	C	71	T	5,241	5,476845	0,235845	0,188676	5,052324	0,06315405	631,5405	63154,05	1218	1,929
22. Jun	C	71	C	5,272	5,50924	0,23724	0,189792	5,082208	0,0635276	635,276	63527,60	910	1,432
22. Jun	C	71	L	6,030	6,30135	0,27135	0,21708	5,81292	0,0726615	726,615	72661,50	1995	2,746
22. Jun	T	68	T	5,092	5,32114	0,22914	0,183312	4,908688	0,0613586	613,586	61358,60	1161	1,892
22. Jun	T	68	C	6,341	6,626345	0,285345	0,228276	6,112724	0,07640905	764,0905	76409,05	3268	4,277
22. Jun	T	68	L	8,185	8,553325	0,368325	0,29466	7,89034	0,09862925	986,2925	98629,25	7064	7,162
19. Jul	C	72	T	6,967	7,280515	0,313515	0,250812	6,716188	0,08395235	839,5235	83952,35	1324	1,577
19. Jul	C	72	C	5,969	6,237605	0,268605	0,214884	5,754116	0,07192645	719,2645	71926,45	1589	2,209
19. Jul	C	72	L	10,052	10,50434	0,45234	0,361872	9,690128	0,1211266	1211,266	121126,60	4248	3,507
19. Jul	T	69	T	4,838	5,05571	0,21771	0,174168	4,663832	0,0582979	582,979	58297,90	1626	2,789
19. Jul	T	69	C	3,735	3,903075	0,168075	0,13446	3,60054	0,04500675	450,0675	45006,75	3393	7,539
19. Jul	T	69	L	6,165	6,442425	0,277425	0,22194	5,94306	0,07428825	742,8825	74288,25	3047	4,102

155

General thoughts:

a A4 sheat is 1/16 of a A0 sheat

if a A0 sheat weights 80gr, a A4 sheat should weigh 1/16 of 80gr, which is 5 gr.

Testsheats	Plain weight in gr	Weight with Ink in gr	Difference in weight	Average
1.)	4,870	5,095	1,0462012	
2.)	4,825	5,035	1,0435233	1,0450099
3.)	4,878	5,099	1,0453054	

Ink correction factor is 1,045
used on 80 % of leaf surface,
since only partially portrayed

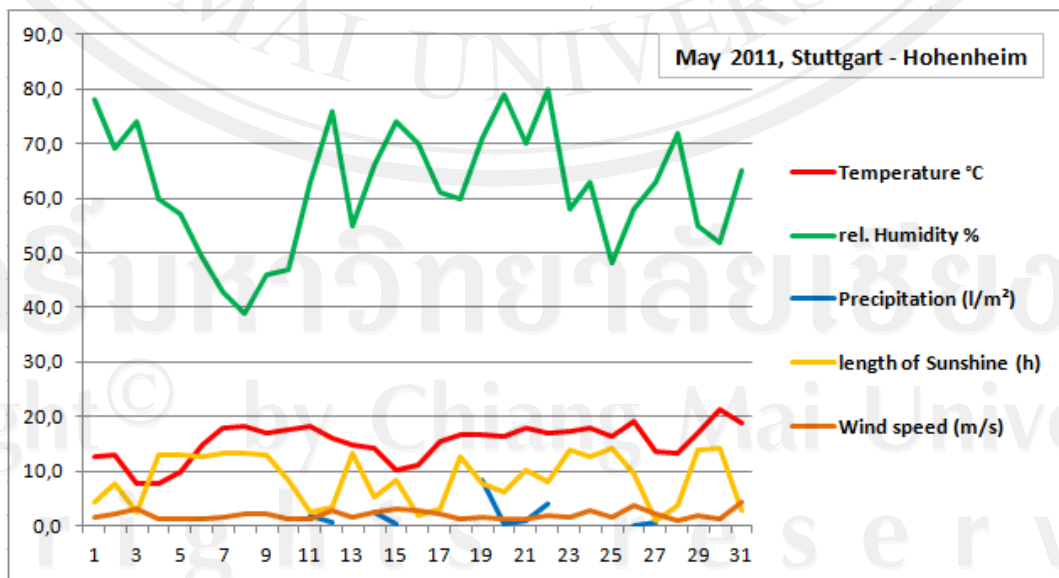
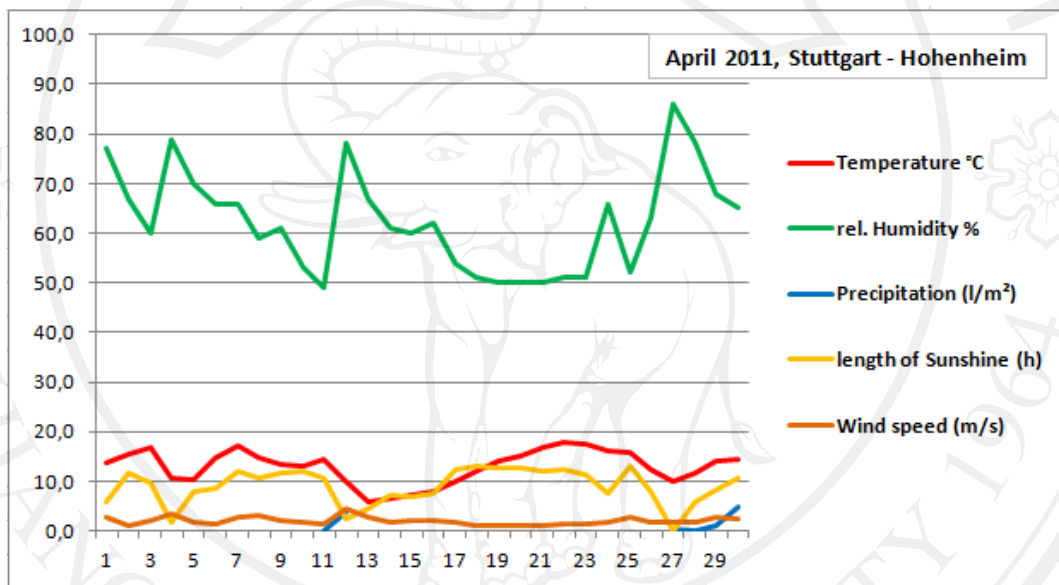
Appendix B

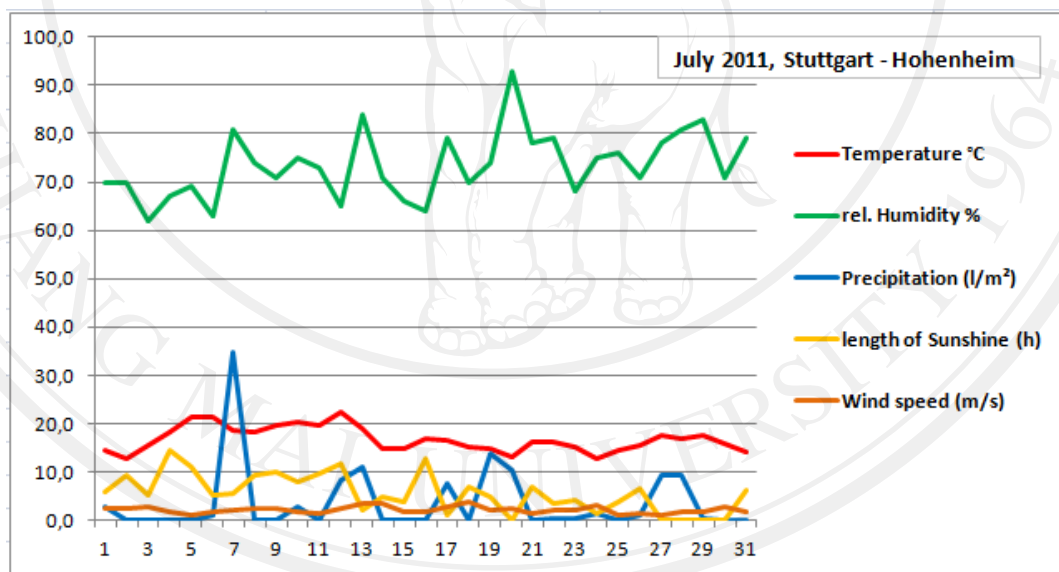
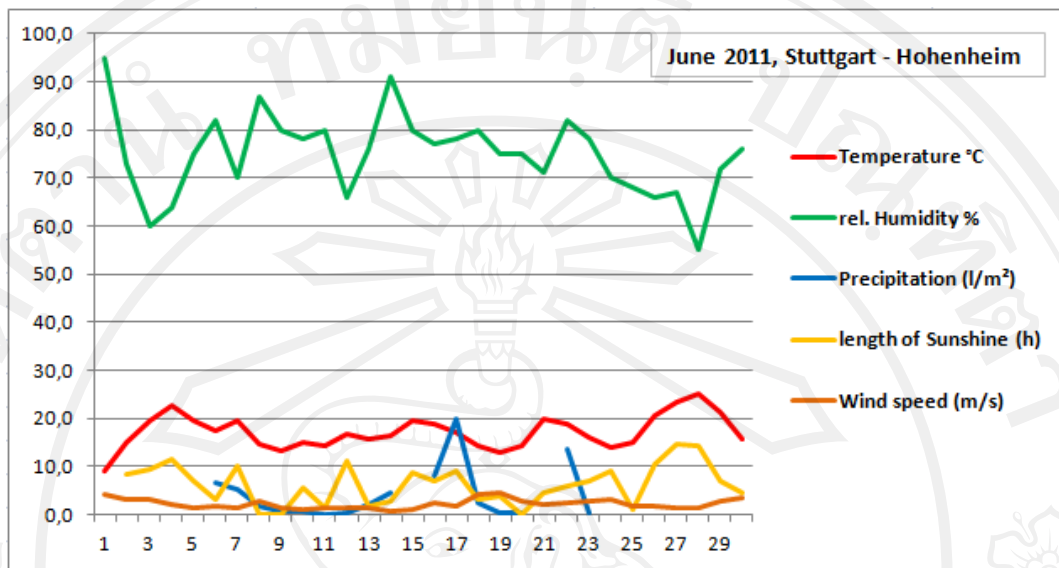
Weather data for the month of April to September 2011

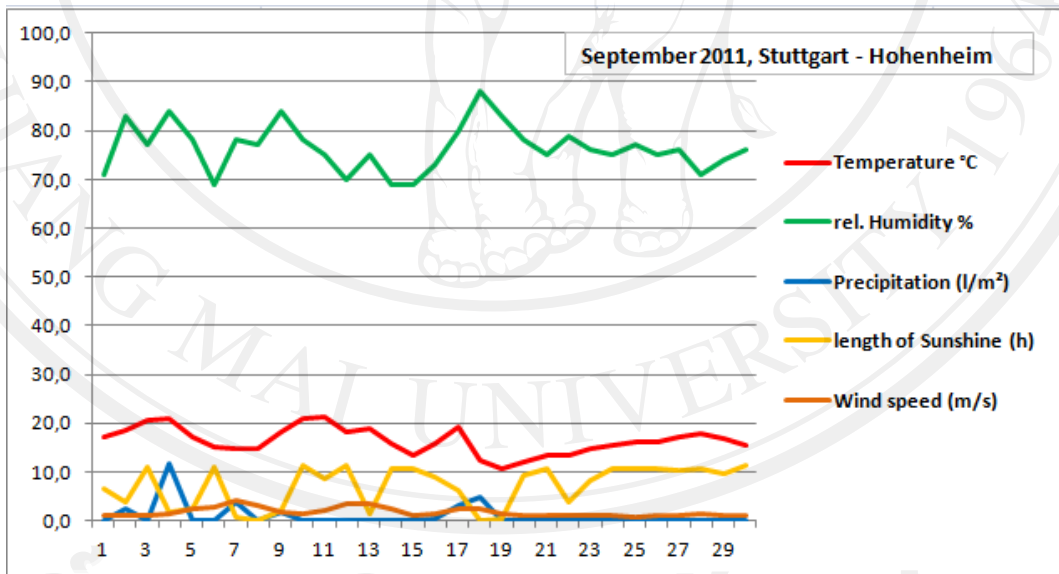
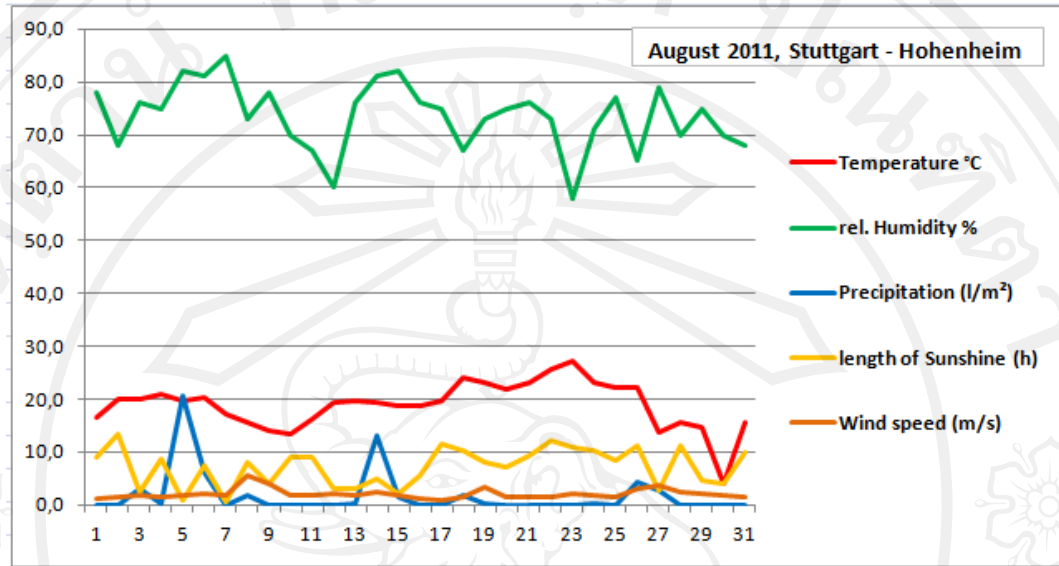
Institute of Physics and Meteorology of

University of Hohenheim / Stuttgart (407m a.s.l.)

(average day values are given; temperature and rel. humidity is measured 2m above ground, wind speed is measured 10 m above ground)







Appendix C

Inventory of tree descriptions and tree locations

Inventory of <i>Quercus robur</i> at "Schwieberdinger Street" in Stuttgart	
Average estimates of trees observed in this research	
Tree age	35 years
Tree height	14 to 18 m
Tree stem height until canopy	2,5 to 3,5 m
Canopy diameter	9 to 13 m
Tree diameter	25 to 40 cm
Distance tree to tree	10 m
Growing zone	open continuous grass strip with 4 m width (trees centered)
<i>Treatments</i>	<i>Fertilization with iron chelate in 2009</i>
	<i>Fertilization with iron chelate and bioturbation in 2012 (planned)</i>

Inventory of <i>Platanus x hispanica</i> at "Schwieberdinger Street" in Stuttgart	
Average estimates of trees observed in this research	
Tree age	two trees with 15 years, other trees 40 to 50 years
Tree height	15 to 20 m
Tree stem height until canopy	3 to 4 m
Canopy diameter	7 to 12 m
Tree diameter	35 to 45 cm
Distance tree to tree	8 m
Growing zone	sloping open grass strip with trees having 1m to road
<i>Treatments</i>	<i>Deconstruction of road in 2008 with integration of infiltration blocks</i>

Inventory of <i>Aesculus hippocastanum</i> at "Schwieberdinger Street" in Stuttgart	
Average estimates of trees observed in this research	
Tree age	40 years
Tree height	10 to 15 m
Tree stem height until canopy	2 to 3 m
Canopy diameter	7 to 10 m
Tree diameter	25 to 35 cm
Distance tree to tree	8 m
Growing zone	2,5 m X 12 m for 2 trees at a time (2,5 m X 6 m each)
<i>Treatments</i>	<i>Removal of shrubs and seeding of grass in 2008</i>
	<i>Bioturbation with integration of clay and humus in 2011</i>

Appendix D

General information's and used fill in form

Versuchsplan - Neem Azal Testreihe der Firma Trifolio durchgeführt von Kai Bauer, 2011											Stand 8. September 2011
Application of Neem Azal with monitoring of pest and leaf collecting dates:											
	20. April	05. May	18. May	25. May	31. May	15. June	22. June	28. June	12. July	19. July	27. July
Quercus	X	X	X	X	(Nester werden entfernt)						
Platanus	X	X	X	X	X	X	X	X			
Aesculus			X	X	X	X	X	X	X	X	X
Tree species:					main target pest to be observed:						
Quercus robur					EPS (Eichenprozessionsspinner) - <i>Thaumetopoea processionea</i>						
Platanus x hispanica					Platanennetzwanze - <i>Corythucha ciliata</i>						
Aesculus hippocastanum					Kastanienminiermotte - <i>Cameraria ohridella</i>						
Methode / Assessment											
Quercus - visuelle observation with data collection, leaf collection to define Azadirachtin contend after 3 applications (lower and upper canopy)											
Platanus - visuelle observation with data collection, leaf collection to define Azadirachtin contend after 3 and 5 applications (lower and upper canopy)											
Aesculus - visuelle observation with data collection, leaf collection with lab analysis to define Azadirachtin contend after 1, 3 and 5 applications (lower and upper canopy)											
Aesculus - Pheromon traps to monitor target pest population - occurrence and development (frequent monitoring)											
Methode / Assessment explanation											
visuelle observation with data collection - presence of pest monitored by counting of population numbers and / or nest numbers and sizes - assessment											
visuelle observation with data collection - presence of antagonists of pest also monitored - assessment											
Azadirachtin contend - analysis of systemic effects on different tree species with different physiological properties											
leaf collection with lab analysis - 10 representative leaves taken from lower and upper tree canopy, pest pressure monitored and content of Azadirachtin in leaves analysed (MS-HPLC)											
leaf collection - randomly selection of trees for leaf collection (zufällige Auswahl von je 3 behandelten Bäumen und 3 unbehandelten Bäumen)											
leaf collection with lab analysis on Aesculus - Anzahl Minengänge pro Blatt und Minengröße unterteilt in Klassen											
leaf collection with lab analysis on Aesculus - Azadirachtin contend assessed after 1, 3 and 5 applications											

Curriculum Vitae

Name

Mr. Kai Eric Bauer

Date of birth

9th September 1972

Educational background

1995 to 1999:

Academic studies of Forestry at FH Rottenburg am Neckar

Degree: Dipl. Ing. FH Forstwirtschaft

1999 to 2000:

Federal state induction year at Forest department in Ellwangen

Degree: State Exam with nomination to Forest Inspector

2010 to 2012:

Academic studies in SAIWAM program at University of Chiang Mai (CMU) and Hohenheim (HOH)