Appendices

A1 Grower surveys of waratah bract browning

A1.1 Aim

Surveys of commercial waratah growers were conducted from 1999-2003 by the NSW Waratah Industry Network, coordinated by NSW Agriculture. The aim of the surveys was to identify potential causes of browning, provide a background for the present study and suggest avenues for further investigation.

A1.2 Method

The survey was designed by NSW Agriculture and the Waratah Industry Network (WIN) prior to this project. After each waratah flowering season, growers were asked to:

- rank the severity of bract burn/browning on a scale of 1 (no significant browning) to 5 (unmarketable blooms)
- note how long before harvest the disorder was noticed
- note the percentage of the crop that was affected by bract browning
- list which cultivars of waratah were more severely affected by browning
- record the date of first and last harvest of waratahs
- state whether a windbreak or other form of shelter was used
- give details of crop management, including irrigation and fertiliser application
- add any other comments

A1.3 Results

The low number of respondents (Table A1.1) and the high variability of crop management practices meant that statistical analysis of the data was not feasible. The results show that growers observed bract browning in all years between 1999 and 2003, with severity scored between three and five in three out of five years (Figure A1.1). Between 20 - 80% of the waratah crop was affected by bract browning between 2001-2003 (five respondents), however, one grower/exporter reported that an entire crop was lost to bract browning in 2003 (C. Scott, personal communication). Bract browning was generally observed three to six weeks prior to harvest (Figure A1.2), coinciding with bud expansion and opening, although some growers noted browning up to twelve weeks prior to harvest. Harvest occurred from the end of August to the end of October within NSW, lasting for two to six weeks in each region (Table A1.2). Initial harvest dates varied by up to two weeks each year.

Table A1.1: Number of respondents to WIN surveys of bract browning in waratahs from 1999 to 2003, grouped by production focus (cut flowers or nursery/botanic garden) and into region for cut flower growers.

		Cut flower growers by region:				Nurseries and botanic gardens	Other
Year	Total respondents	Blue Mountains	Central Coast	North Coast	South Coast	Blue Mountains and SW Sydney	Various locations
1999	8			3	2	2	1 (Sydney)
2000	12	3	1	4	2	1	1 (Victoria)
2001	5	1	2		1		1 (Wingello)
2002	1	1					
2003	1		1				

Table A1.2: Mean date of first and last waratah harvest from 1999 to 2003 across growing regions in NSW. Range of dates for first and last harvest in a region presented where there was more than one respondent in each region.

		Region							
		Blue Mountains		Central Coast		North Coast		South Coast	
Year	Date of picking	Mean	Range	Mean	Range	Mean	Range	Mean	Range
1999	First					31/08	26/08 - 03/09	19/09	17/09 - 22/09
	Last					10/10	29/09 - 20/10	23/10	15/10 - 1/11
2000	First	28/09	19/09-10/10	01/09		14/09	30/08 - 01/10	19/09	12/09 - 27/09
	Last	14/11	30/10- 06/12	15/10		31/10	01/10 - 15/12	30/10	29/10 - 31/10
2001	First			04/09	02/09 -07/09			12/09	
	Last			03/10	03/10			12/10	
2002	First	15/09							
	Last	05/10							
2003	First			20/08					
	Last			09/10					

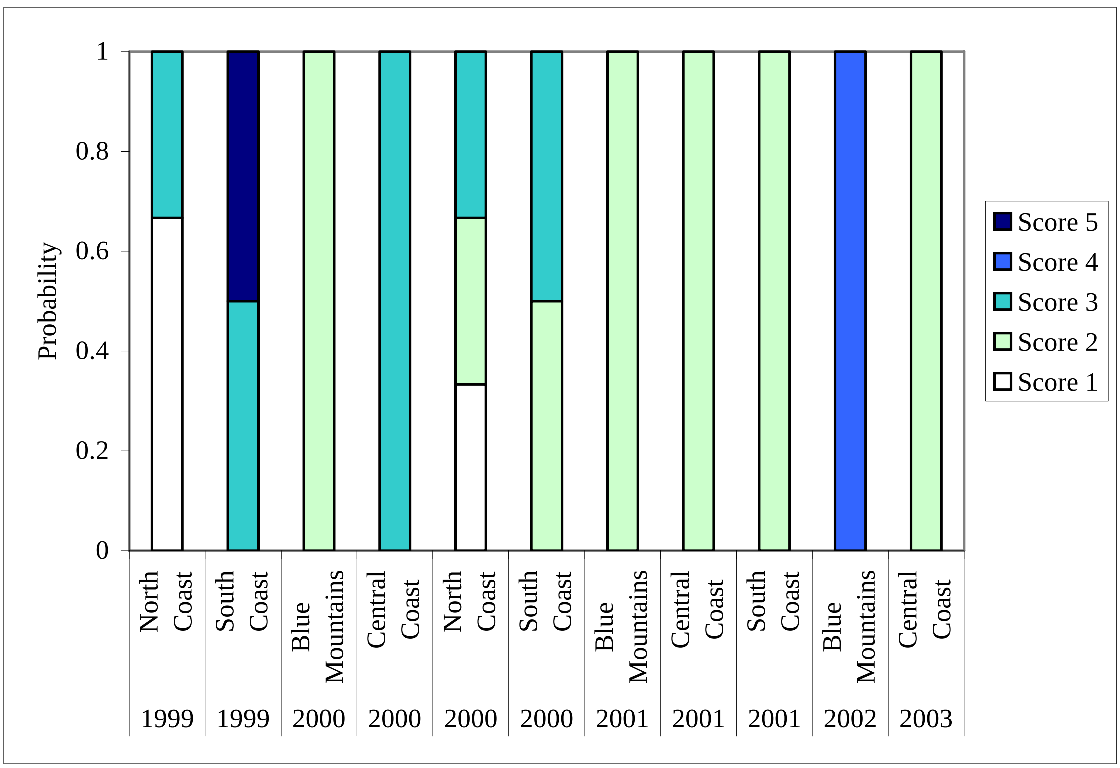

Figure A1.1: Probability of waratah bract browning scores between 1 (no significant browning) and 5 (unmarketable flowers) allocated by commercial cut flower growers from 1999-2003. n = 1 - 3 responses per region per year.

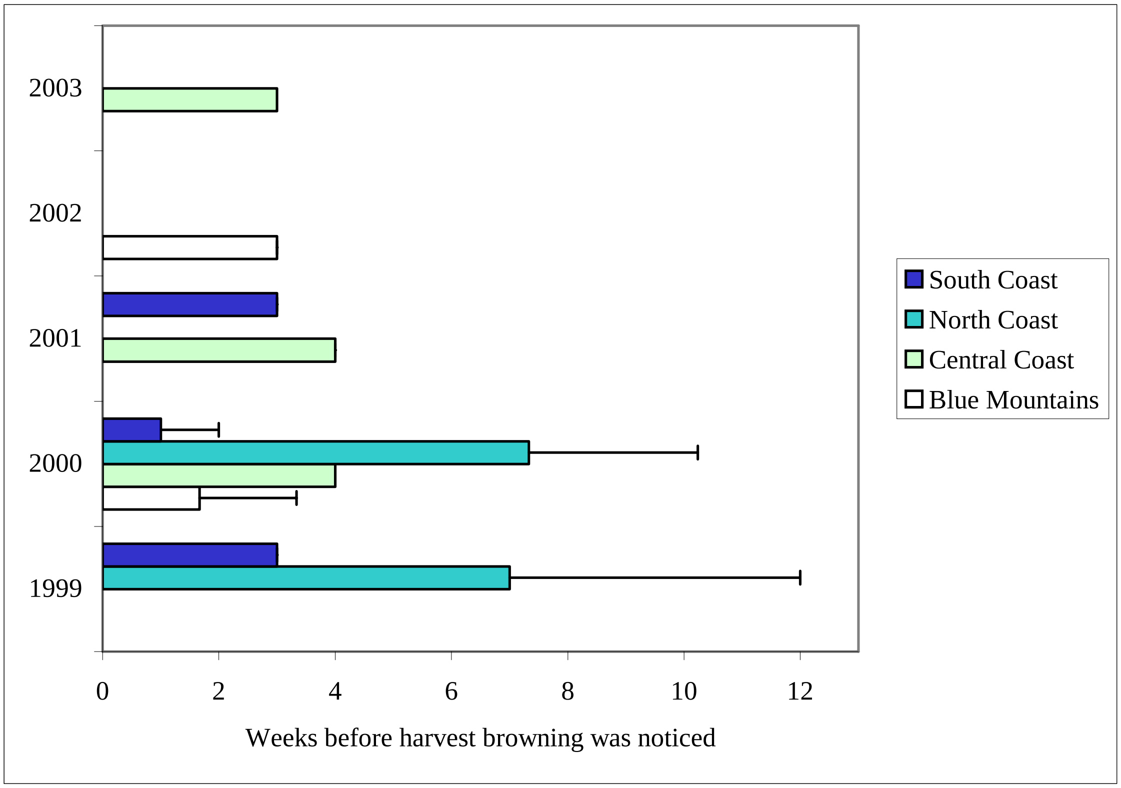

Figure A1.2: Weeks prior to waratah harvest that bract browning was noticed, as described by commercial cut flower growers from 1999-2003. Growers are grouped by region of cultivation, from the Blue Mountains (blue), to the North (green), Central (pink) and South (purple) Coast of NSW. Bars represent standard error of the mean.

The most affected cultivars include ‘Fire and Brimstone’, ‘Fire and Ice’, ‘Sunflare’, ‘Cardinal’, ‘Shady Lady’, ‘Shade of Pale’ (Figure A1.3) and other pink cultivars, and white cultivars including ‘Wirrimbirra White’. Growers with seedling grown plants of different genetic backgrounds, noted that bract browning varied between plants and that waratahs with long bracts (Figure A1.4a and b) and those that flowered early were most affected. Growers commented that bract browning occurred with ‘hot dry winds, very hot days, full sun’, ‘plant stress’, ‘hot sunny days…more to do with temperature than water availability’, ‘high winds’ and ‘extreme hot weather’.

Figure A1.3: ‘Shade of Pale’ waratahs grown in Bilpin in 2003, showing severe bract browning.

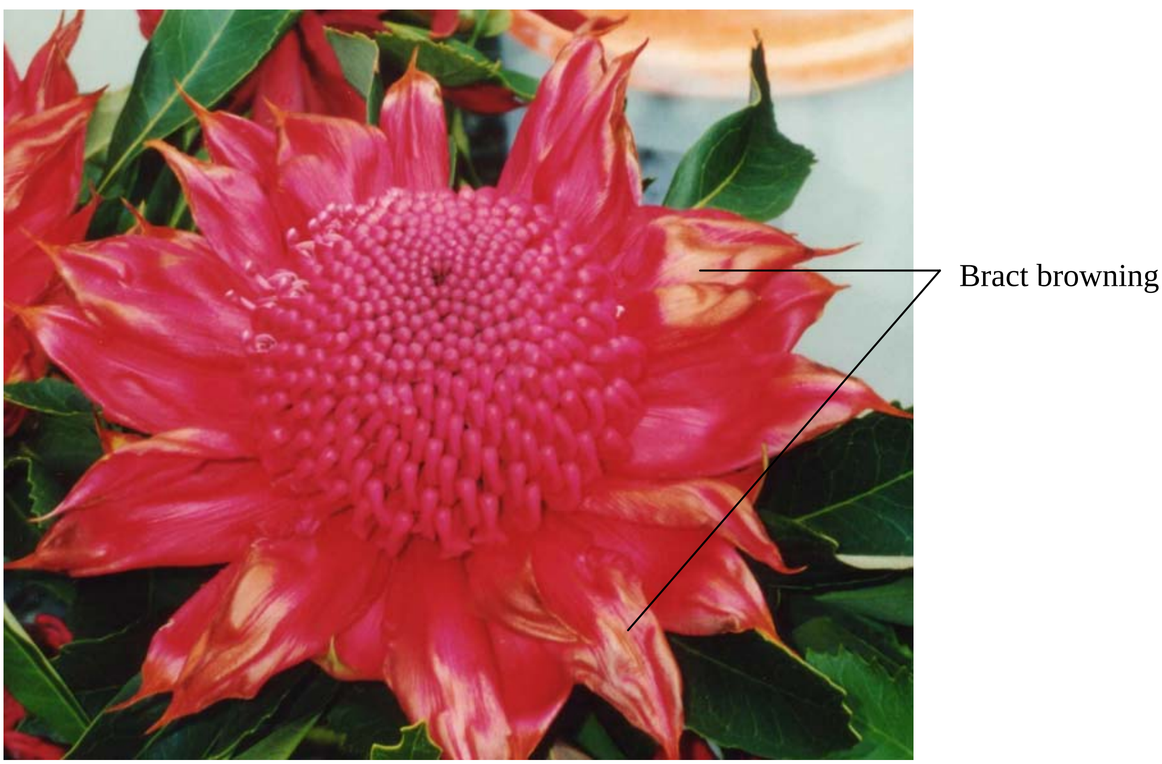

Figure A1.4a: Seedling waratah with large bracts, grown in Bilpin 2003, showing severe bract browning.

Figure A1.4b: Waratah exhibiting bract browning on long bracts (Sydney Flower Markets 2001).

Of twenty two growers, seventeen provided shelter using trees (Figure A1.5) and/or artificial windbreaks (Figure A1.6). However, several growers noted that trees provided shelter from one aspect only, or windbreak plants were very young and therefore, ineffective. Shade was provided by one waratah grower over their white cultivar only. Four growers provided no shelter around their waratah plantation (Figure A1.7). One grower who supplied the export market cultivated red and white waratah cultivars under white shade cloth year round (Figure A1.8).


Figure A1.5: Waratah plantation of Grower 8 surrounded by natural bush in the Blue Mountains, NSW.


Figure A1.6: Artificial windbreak next to staked waratah plants on the property of Grower 3 at Beechwood on the north coast of NSW.

Figure A1.7: Waratah plantation with little protection on the property of Grower 4 at Wauchope on the north coast of NSW.

Figure A1.8: Commercially grown 'Wirrimbirra White' waratahs under white shade cloth at Robertson on the south coast of NSW.

While the survey responses were not representative of all waratah growers in Australia and were a subjective assessment of the cause of bract browning (B. Gollnow, personal communication), they revealed important details about the nature of bract browning, which were used to further investigate the disorder.

The collated survey data are presented in Table A1.3, as the results have not been analysed in any other publication.

Table A1.3: Results of grower survey by Waratah Industry Network and NSW Agriculture, 1999-2003. BB = bract burn/browning. Score 1 = no significant burn to 5 = unmarketable. Noticed? = weeks bract browning was noticed prior to harvest. Irrig = irrigation.

Year	Address	Post code	Region	BB this year?	Score	Noticed?	BB last year?	Score	% crop affected this year?	% crop affected last year?	Noticed?	First pick	Last pick	Wind break	Rainfall	Irrig summer	Irrig July to harvest	Fertiliser
1999	Yowrie	2550	South Coast	Y	3	3 wks	Y	4			3 wks	22/09/99	1/11/99	Y	Summer 381mm Autumn 94.5mm	Weekly when little rain	Twice a week	Inadequate
1999	Macksville	2447	North Coast	Y	1	2 wks	Y	3			2-3 wks	2/09/99	20/10/99	N	Higher than average	4 times	Not needed - high rainfall	Adequate (2 X osmocote for natives)
1999	Caparra	2429	North Coast	Y	1	Not severe	Y	2			Just before harvest	3/09/99	29/09/99	Y	Summer 534mm Autumn 433mm	Very little - high rainfall	Very little - high rainfall	Inadequate
1999	Berry	2535	South Coast	Y	5	50% unmark-etable	Y	3				17/09/99	15/10/99	N	Summer 440mm Autumn 289mm	None	None except for named cv's	Possibly too much (Blood & bone Sept/ Oct)
1999	Craven	2422	North Coast	Y	3	3 months	Y	1				26/08/99	11/10/99	Y	Dec-May 632mm	None	None - high rainfall	Possibly inadequate (1 X Nutricote purple in Jan)
1999	Oakdale	2570	Sydney	Y	2		Y	3			1 month	28/09/99	7/10/99	N	249mm total	1 -2 X wk	1X wk	Too much

Year	Address	Post code	Region	BB this year?	Score	Noticed?	BB last year?	Score	% crop affected this year?	% crop affected last year?	Noticed?	First pick	Last pick	Wind break	Rainfall	Irrig summer	Irrig July to harvest	Fertiliser
2000	Bilpin	2758	Blue Mountains	Y	2	Just before harvest	Y	2			Just before harvest	26/09/00	9/11/00	Y		Every 2nd day	Every 2nd day until rain	Adequate
2000	Beechwood	2446	North Coast	Y	3.5	2-3 months before	Y	2			2-3 months before	12/09/00	15/10/00	Y	Average	None- enough rain	Twice a week	Adequate slow release
2000	Tucabia	2462	North Coast	Y	3	Early in flower opening						1/10/00	15/12/00	Y	50% less than average		Twice a week	Adequate
2000	Woollamia	2540	South Coast	Y	3.5	2 wks before harvest	Y	3.5			2 wks before harvest	27/09/00	31/10/00	Y	Call to check	Approx 1/wk	Approx 1/wk	Inadequate
2000	Bunyip, Vic.	3815	Victoria	Y	2	3-4 wks before harvest	Y	2			3-4 wks before harvest	25/09/00	30/10/00	N	>900mm	None	None	Adequate
2000	Somersby	2250	Central Coast	Y	3	One month before harvest but can detect earlier	Y	3			One month before harvest but can detect earlier	1/09/00	15/10/00	Y	Approx 1250mm	6-8L/wk	6-8L/wk	Adequate - too much
2000	Bilpin	2758	Blue Mountains	Y	2.5	4-5 wks before harvest	Y	3.5			2-3 wks before harvest	19/09/00	30/10/00	Y	?	1x fortnight	Twice a week	Adequate
2000	Wyndham	2550	South Coast	Y	1.5	At harvest in hot weather	Y	3.5			Months before	12/09/00	29/10/00	Y	519mm (average 320mm)	Twice a week	Infrequent-ly	Adequate by fertigation through summer

Year	Address	Post code	Region	BB this year?	Score	Noticed?	BB last year?	Score	% crop affected this year?	% crop affected last year?	Noticed?	First pick	Last pick	Wind break	Rainfall	Irrig summer	Irrig July to harvest	Fertiliser
2000	Wauchope	2446	North Coast	Y	2	2 wks before harvest	Y	2			2 wks before harvest	30/08/00	1/11/00	N	Above average	1-2X week	1-2X week	Inadequate
2000	Bell	2786	Blue Mountains	Y	2	At harvest	Y	2			At harvest	10/10/00	6/12/00	Y	Approx 500mm	Infrequently	Don't know	Possibly too much
2000	Bellingen	2454	North Coast	Y	1		Y	3			Several days before harvest	15/09/00	1/10/00	Y	Above average till mid May then drought	Twice a week	When necessary	Adequate
2001	Wapengo via Bega	2550	South Coast	Y	2	3 weeks	Y	3	25%		3 wks	12/09/01	12/10/01	Y	Jan 57mm	Summer 2X wk	Nil	Adequate
2001	Wyong Creek	2259	Central Coast	Y	3	3-4 weeks	Y	4	80%		3-4 weeks	2/09/01	3/10/01	Y		up to 3x wk	1x wk	Inadequate
2001	Wingello	2579	between Exeter & Marulan	Y	2	6 wks	Y	2	30%		3 weeks	2/10/01	12/10/01	N		only if V dry	Nil	Adequate
2001	Mangrove Mtn	2250	Central Coast	Y	2		Y	2			1-2 wks	7/09/01	3/10/01	Y		1-2x wk	1-2x wk	Adequate
2001	Bilpin	2758	Blue Mountains	Y	2													Adequate
2002	Bilpin	2758	Blue Mountains	Y	4	3 weeks	Y	2	80%	30%	1 day	15/09/02	5/10/02	Y	300mm	2x wk	2x wk	Inadequate
2003	Mangrove Mtn	2250	Central Coast	Y	2	2-3 wks	Y	2	20%	10%		20/08/03	9/10/03	Y		1-2x wk	2x wk	Adequate

A2 Analysis of calcium treatment effects on bract browning score

Table A2.1: Analysis of enclosed waratah bract score data by ordinal logistic regression using cultivar, nutrition and cultivar by nutrition interaction as predictors.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-8.37395	3.34805	-2.5	0.012			
Const(2)	-4.80902	2.88963	-1.66	0.096			
Const(3)	-4.38778	2.87226	-1.53	0.127			
Cultivar	2.83489	1.47737	1.92	0.055	17.03	0.94	308.13
Nutrition	0.90356	0.81407	1.11	0.267	2.47	0.50	12.17
Cultivar*Nutrition	-0.59231	0.41927	-1.41	0.158	0.55	0.24	1.26

Table A2.2: Analysis of exposed waratah bract score data by ordinal logistic regression using cultivar, nutrition and cultivar by nutrition interaction as predictors.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-5.50041	2.68876	-2.05	0.041			
Const(2)	-2.86476	2.53267	-1.13	0.258			
Const(3)	-2.24655	2.51620	-0.89	0.372			
Cultivar	0.25881	1.25278	0.21	0.836	1.30	0.11	15.09
Nutrition	0.88749	0.75643	1.17	0.241	2.43	0.55	10.70
Cultivar*Nutrition	-0.14872	0.38204	-0.39	0.697	0.86	0.41	1.82

Table A2.3: Analysis of basal waratah bract score data by ordinal logistic regression using cultivar, nutrition and cultivar by nutrition interaction as predictors.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-4.50801	2.03968	-2.21	0.027			
Const(2)	-2.72505	1.95284	-1.40	0.163			
Const(3)	-1.84946	1.92975	-0.96	0.338			
Const(4)	-0.97503	1.91663	-0.51	0.611			
Cultivar	0.93271	0.99995	0.93	0.351	2.54	0.36	18.04
Nutrition	0.71109	0.62216	1.14	0.253	2.04	0.60	6.89
Cultivar*Nutrition	-0.36845	0.32912	-1.12	0.263	0.69	0.36	1.32

Table A2.4: Analysis of waratah bract browning score by ordinal logistic regression using average total calcium concentration as a predictor.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-3.16767	0.83289	-3.80	0.00			
Const(2)	-0.41943	0.62201	-0.67	0.50			
Const(3)	0.02380	0.61946	0.04	0.97			
Average Total Calcium	1.59554	2.94937	0.54	0.59	4.93	0.02	1597.67

Table A2.5: Analysis of waratah bract browning score by ordinal logistic regression using average Fraction A calcium concentration as a predictor.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-3.34277	0.82821	-4.04	0.000			
Const(2)	-0.58038	0.60351	-0.96	0.336			
Const(3)	-0.13490	0.59873	-0.23	0.822			
Average Calcium Fraction A	6.04777	6.96716	0.87	0.385	423.17	0	3.61E+08

Table A2.6: Analysis of waratah bract browning score by ordinal logistic regression using average Fraction B calcium concentration as a predictor.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-2.92143	0.72747	-4.02	0.000			
Const(2)	-0.17815	0.49376	-0.36	0.718			
Const(3)	0.26196	0.49445	0.53	0.596			
Average Calcium Fraction B	0.76595	4.74286	0.16	0.872	2.15	0	23434.19

Table A2.7: Analysis of waratah bract browning score by ordinal logistic regression using average Fraction C calcium concentration as a predictor.

Logistic Regression Table					Odds	95% CI	
Predictor	Coef	SE Coef	Z	P	Ratio	Lower	Upper
Const(1)	-2.96113	0.71064	-4.17	0.000			
Const(2)	-0.21655	0.46429	-0.47	0.641			
Const(3)	0.22477	0.46438	0.48	0.628			
Average Calcium Fraction C	4.01175	14.78460	0.27	0.786	55.24	0	2.12E+14

A3 Light intensity measurements at Mount Annan

Table A3.1: Total solar radiation (Wm^{-2}) measured using Environdata weather station in full sun at Mount Annan in September and October 2003. The correction factor allows direct comparison of PAR data for full sun (measured in October) and shade cloth environments (measured in September), presented in Figure 6.1. Correction factor = (solar radiation in full sun for September/ solar radiation in full sun for October) +1.

	Total solar radiation (Wm^{-2})			
Time (hrs)	September	October	Sept/Oct	Correction factor
06:00	0.000	0.002	0.000	1.000
07:00	0.009	0.023	0.374	1.374
08:00	0.040	0.074	0.545	1.545
09:00	0.071	0.130	0.541	1.541
10:00	0.098	0.169	0.581	1.581
11:00	0.117	0.188	0.620	1.620
12:00	0.124	0.204	0.606	1.606
13:00	0.122	0.202	0.602	1.602
14:00	0.116	0.169	0.686	1.686
15:00	0.102	0.121	0.841	1.841
16:00	0.076	0.080	0.945	1.945
17:00	0.029	0.047	0.609	1.609
18:00	0.001	0.008	0.144	1.144

A4 Photoinhibition measurements

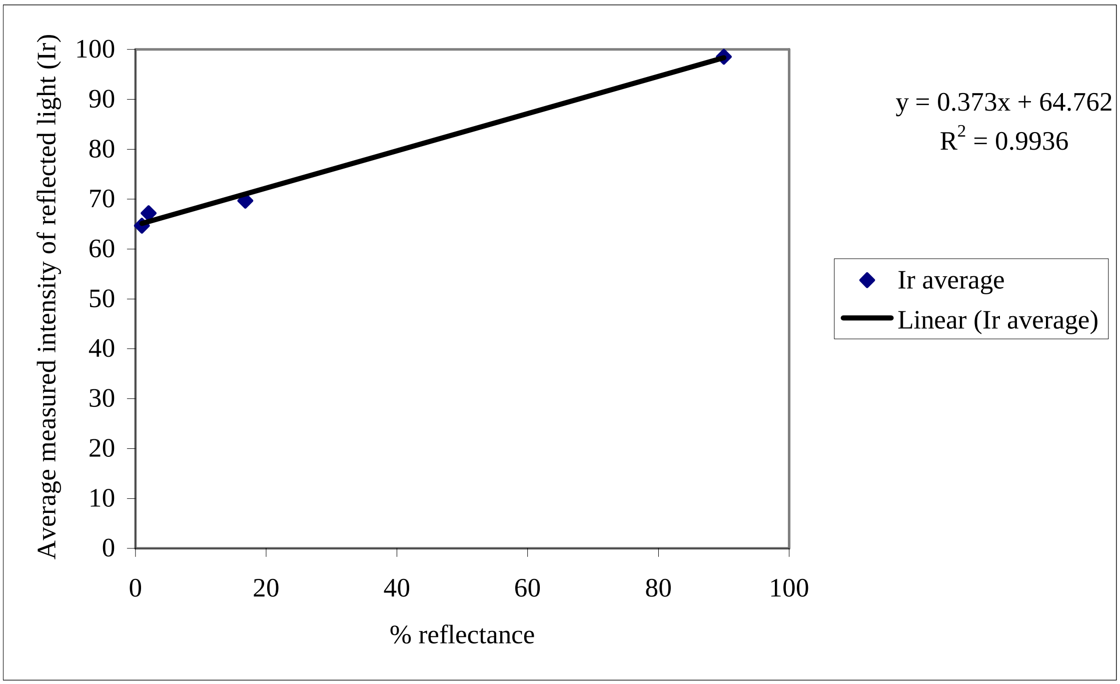

Figure A4.1: Calibration curve for calculation of percentage reflectance using the measured intensity of reflected light of leaves and bracts (Ir) (n=4)

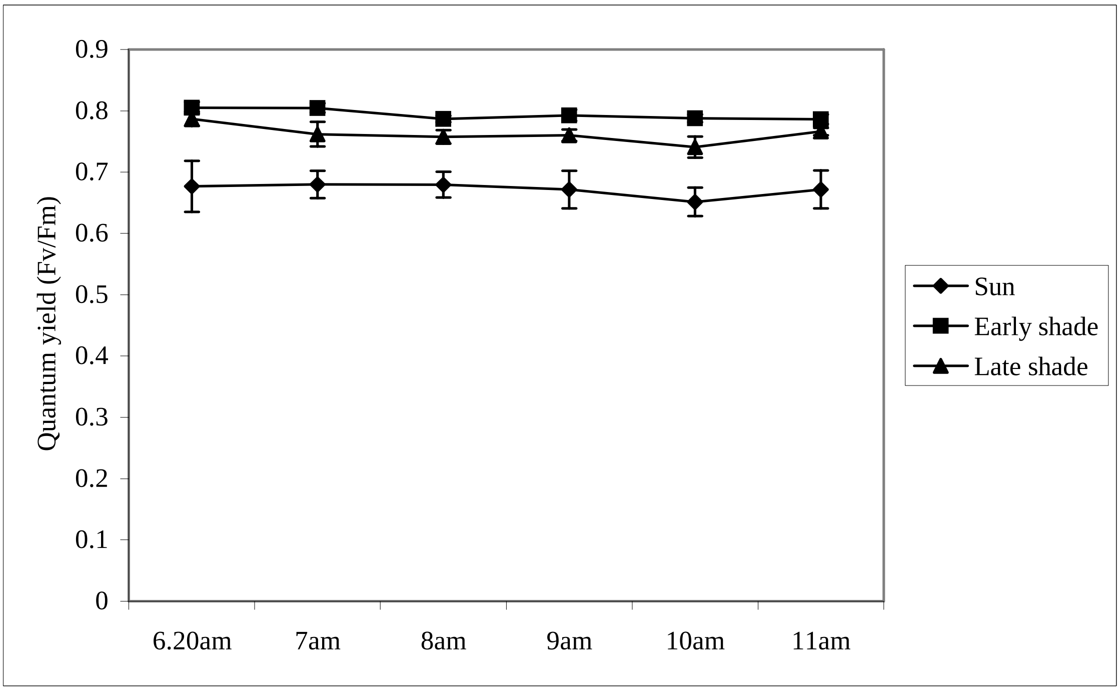

Figure A4.2: Mean quantum yield (Fv/Fm) of leaves (± s.e.) harvested before dawn, showing that quantum yield is stable under laboratory conditions for 5 hrs after harvest.

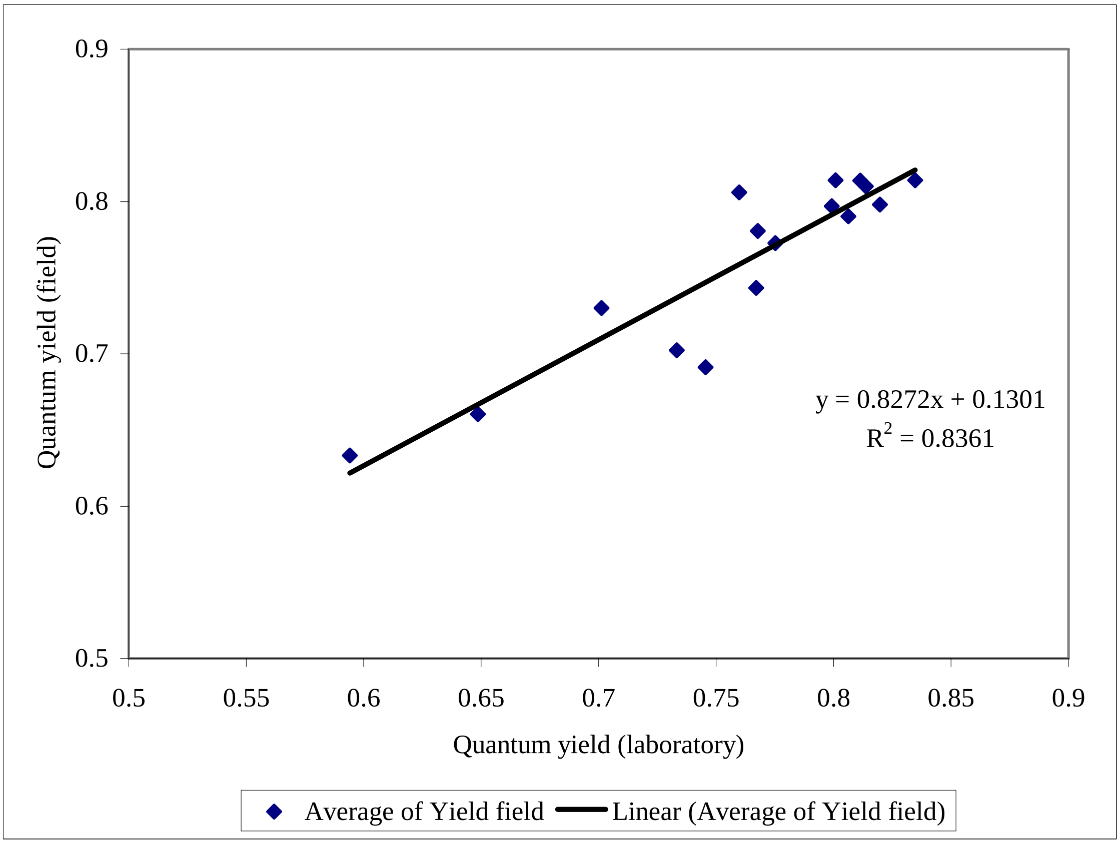

Figure A4.3: Correlation between quantum yield in the field and laboratory of leaves and inner bracts at the mature flower stage, showing a strong positive linear relationship.

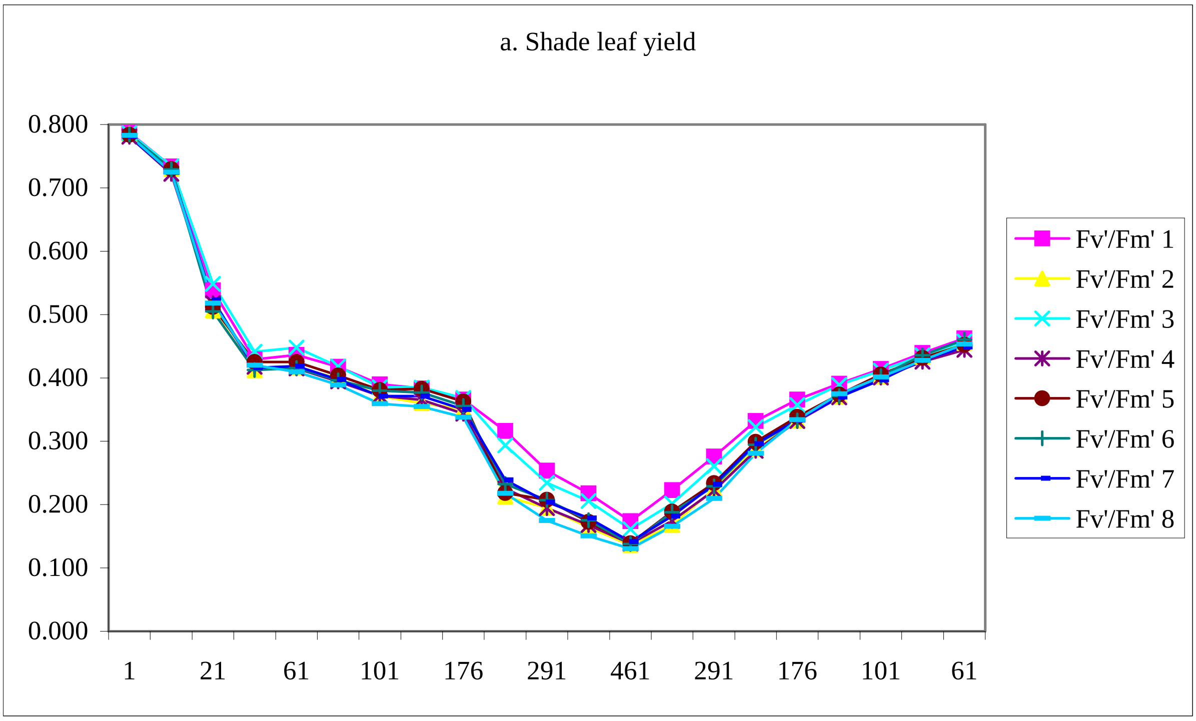

Figure A4.4a: Quantum yield data (Fv/Fm of 0.0 to 0.8) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.41.

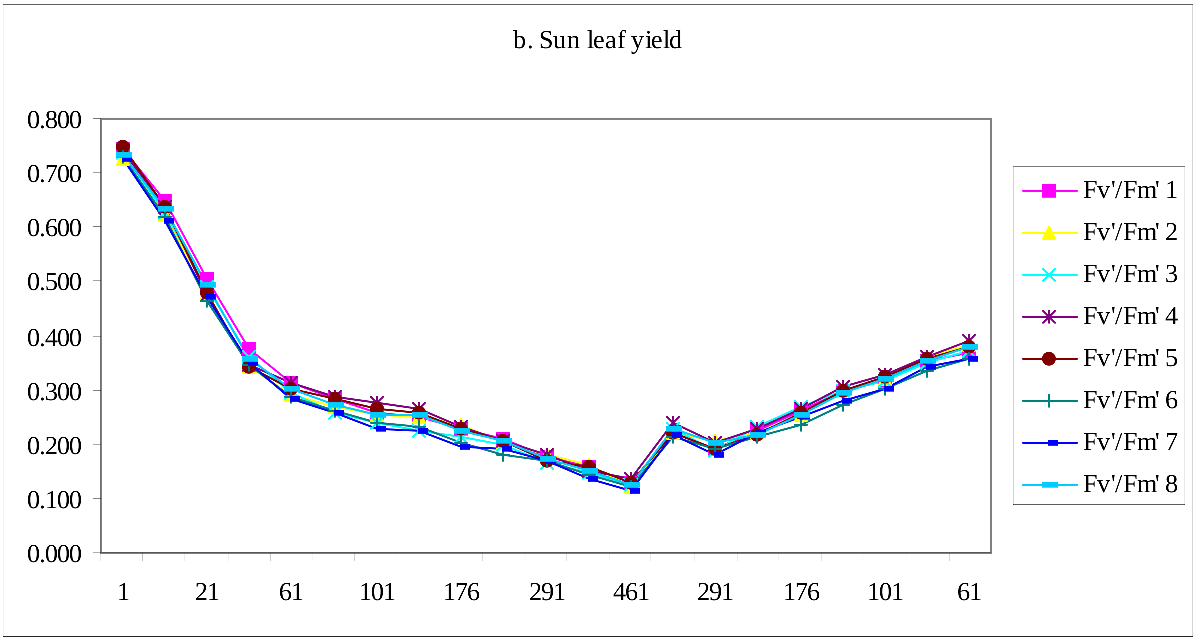

Figure A4.4b: Quantum yield data (Fv/Fm of 0.0 to 0.8) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.40.

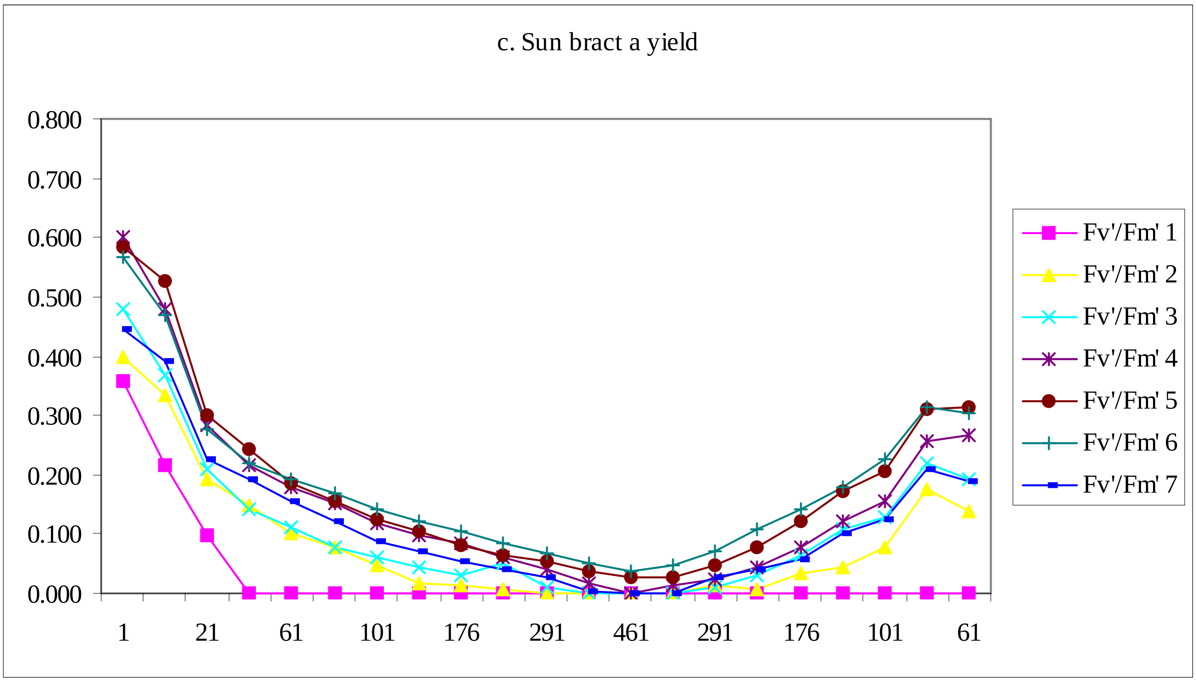

Figure A4.4c: Quantum yield data (Fv/Fm of 0.0 to 0.8) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.42.

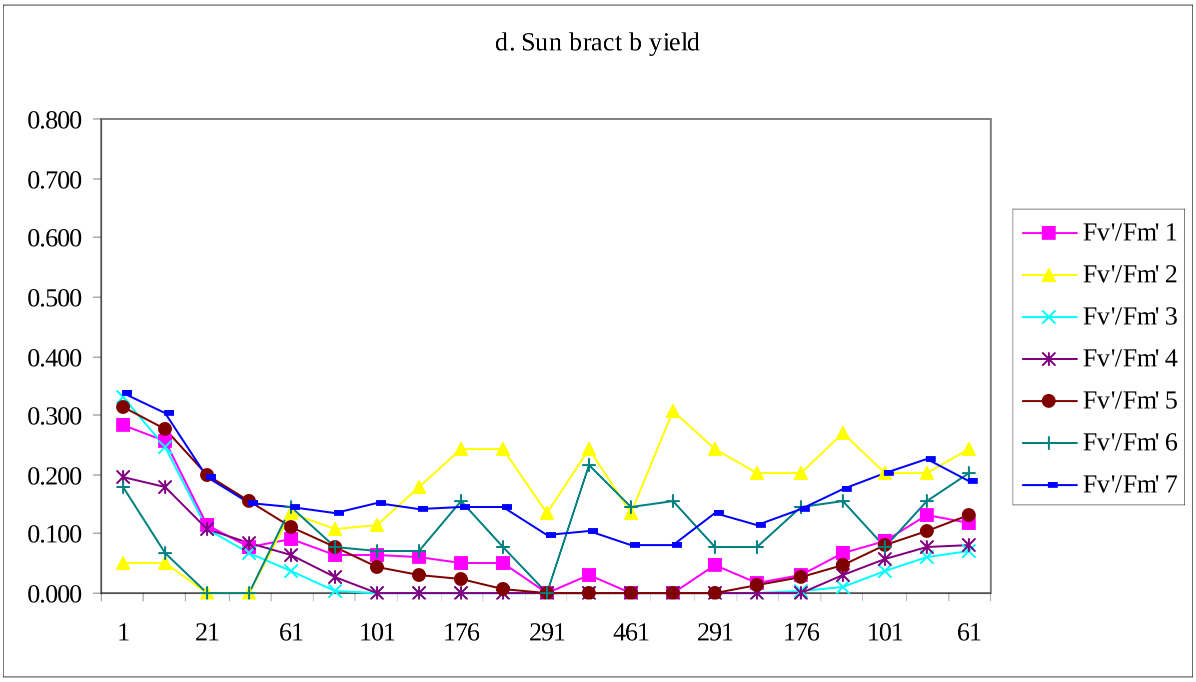

Figure A4.4d: Quantum yield data (Fv/Fm of 0.0 to 0.8) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmolm^{-2}s^{-1}) from areas of interest defined in additional chlorophyll fluorescence images (not presented).

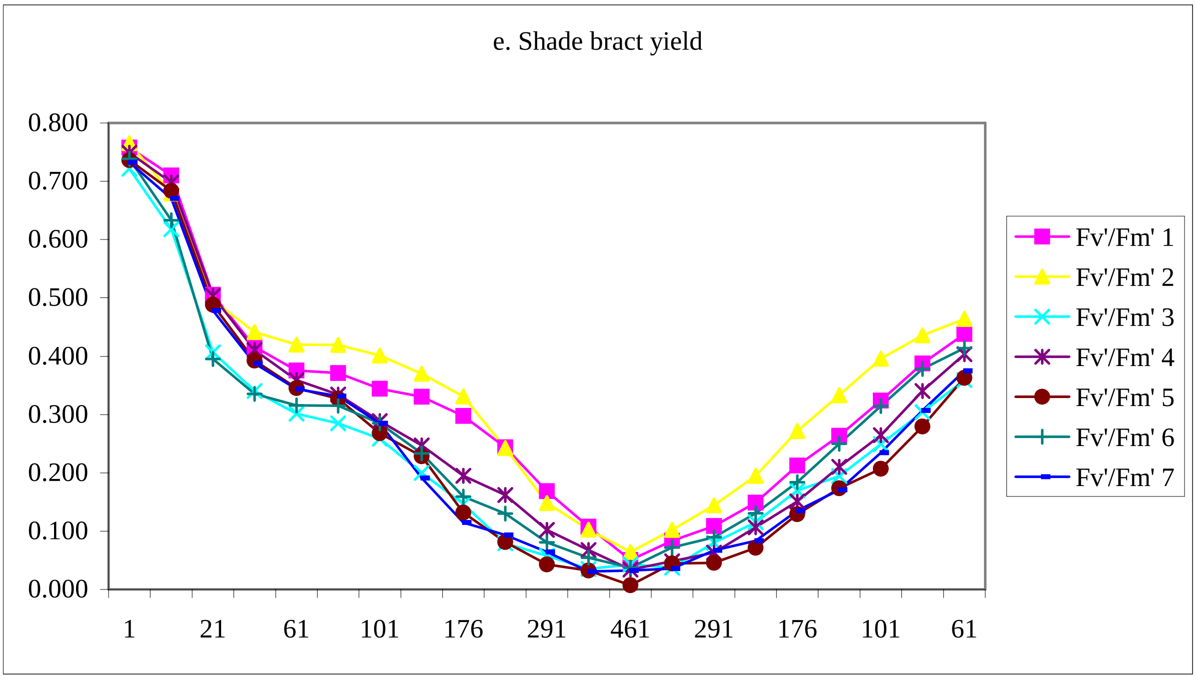

Figure A4.4e: Quantum yield data (Fv/Fm of 0.0 to 0.8) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.43.

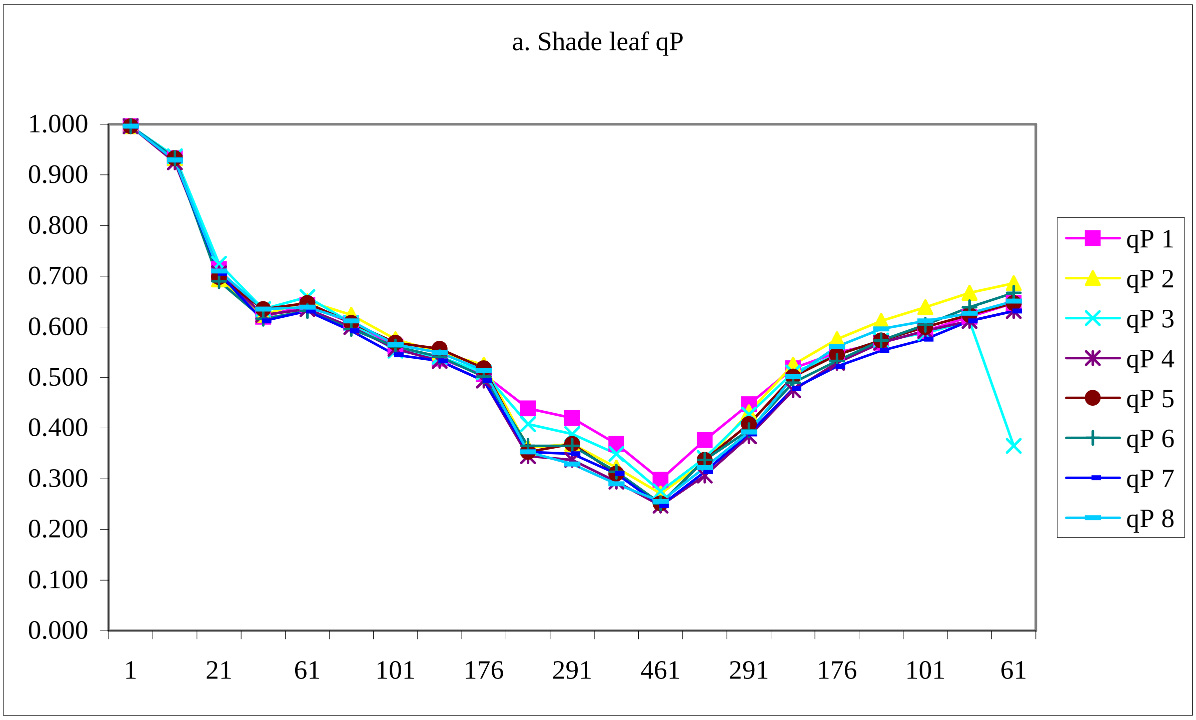

Figure A4.5a: Photochemical quenching (qP) (qP of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmol$m^{-2}s^{-1}$) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.41.

Figure A4.5b: Photochemical quenching (qP) (qP of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmol$m^{-2}s^{-1}$) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.40.

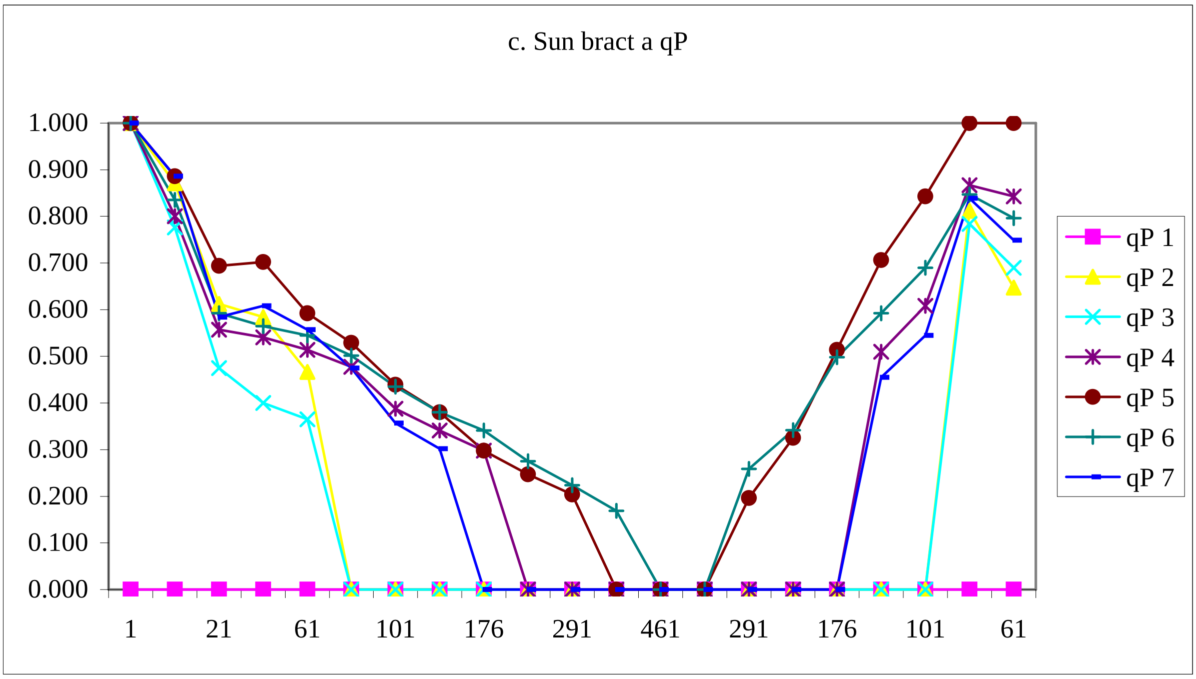

Figure A4.5c: Photochemical quenching (qP) (qP of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.42.

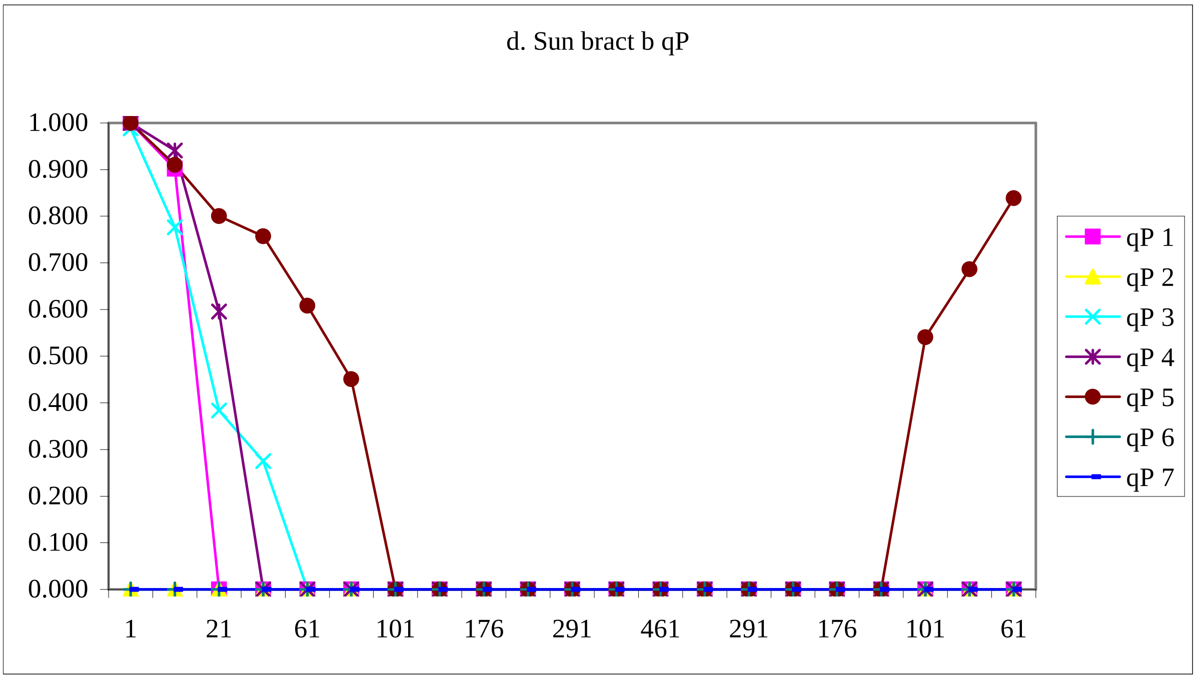

Figure A4.5d: Photochemical quenching (qP) (qP of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in additional chlorophyll fluorescence images (not presented).

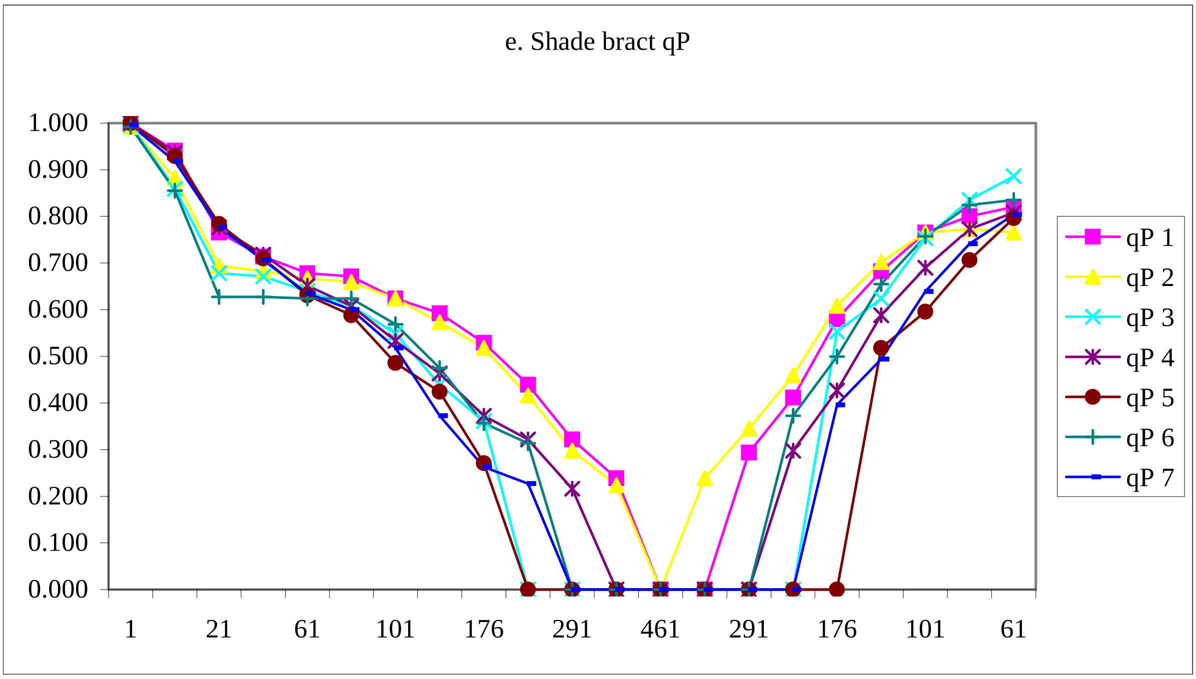

Figure A4.5e: Photochemical quenching (qP) (qP of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.43.

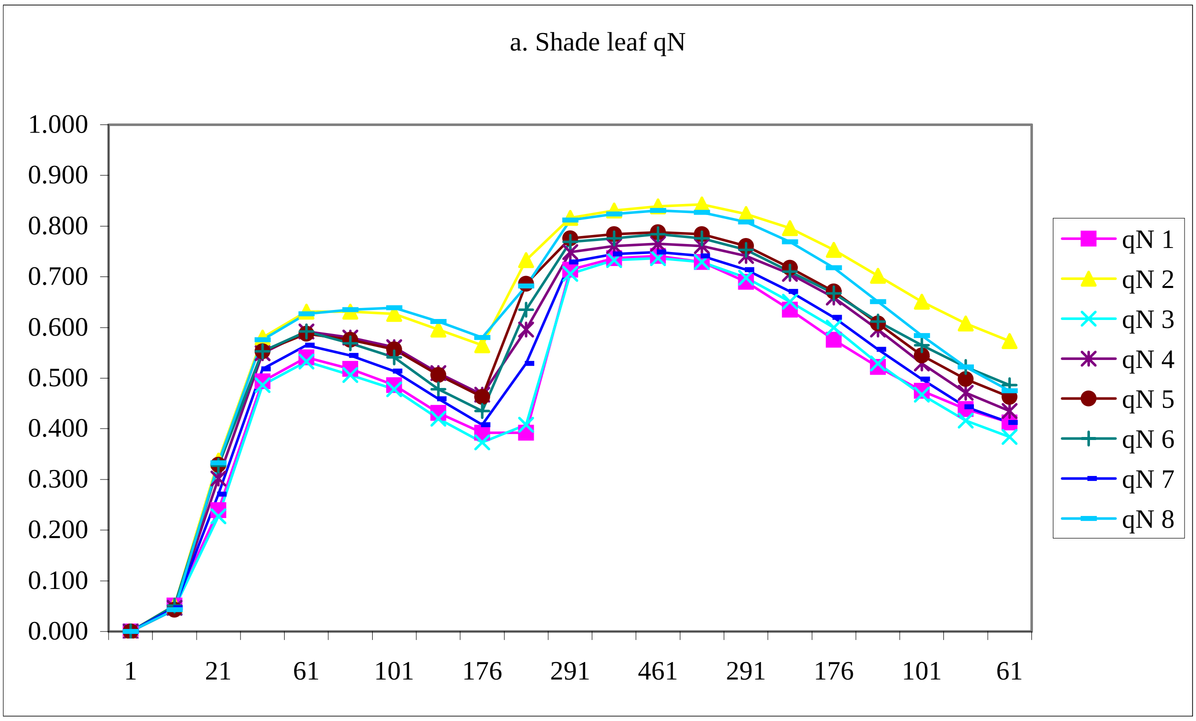

Figure A4.6a: Non-photochemical quenching (qN) (qN of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 μmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.41.

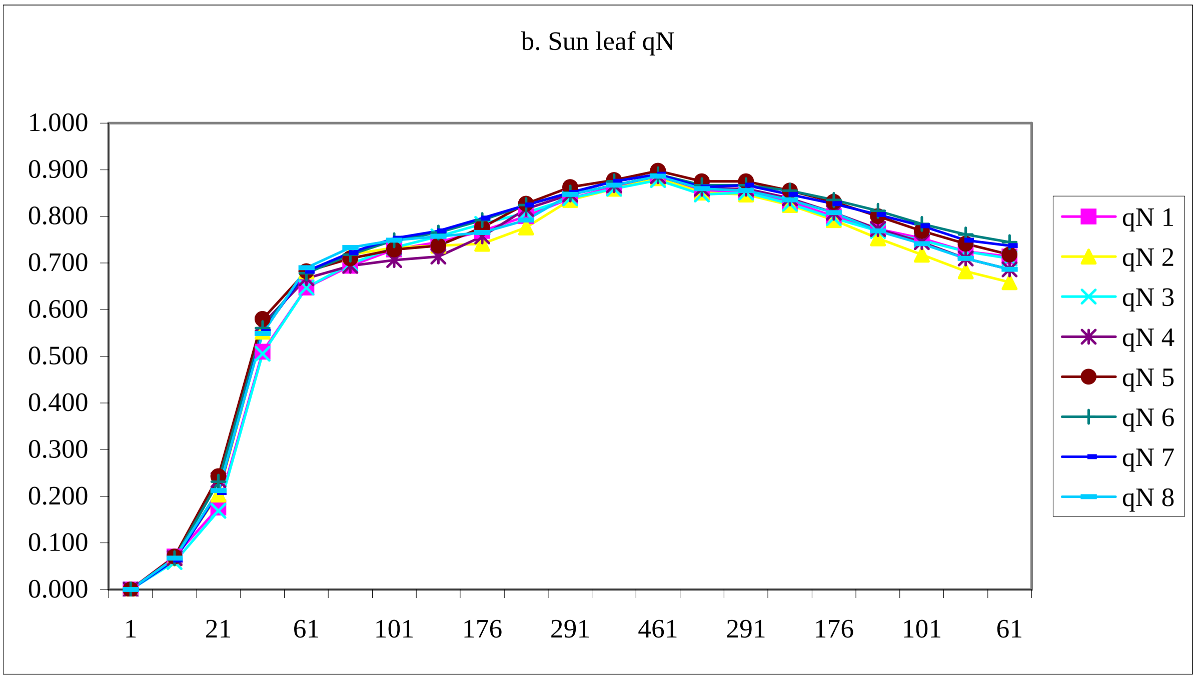

Figure A4.6b: Non-photochemical quenching (qN) (qN of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.40.

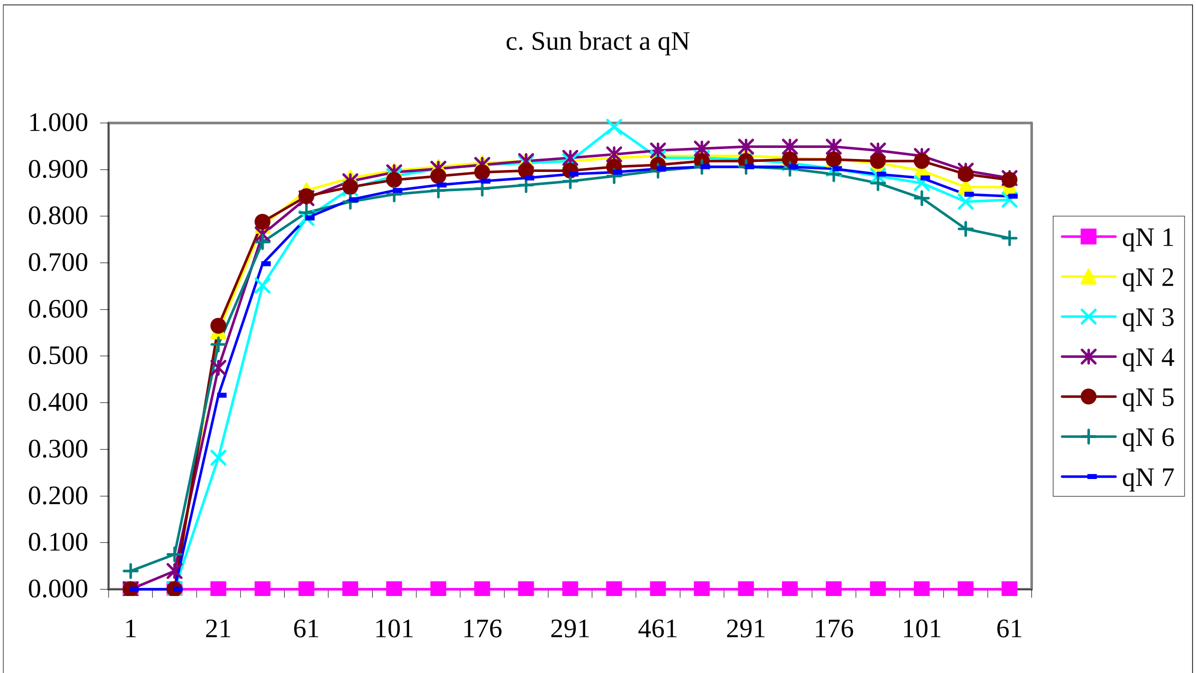

Figure A4.6c: Non-photochemical quenching (qN) (qN of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.42.

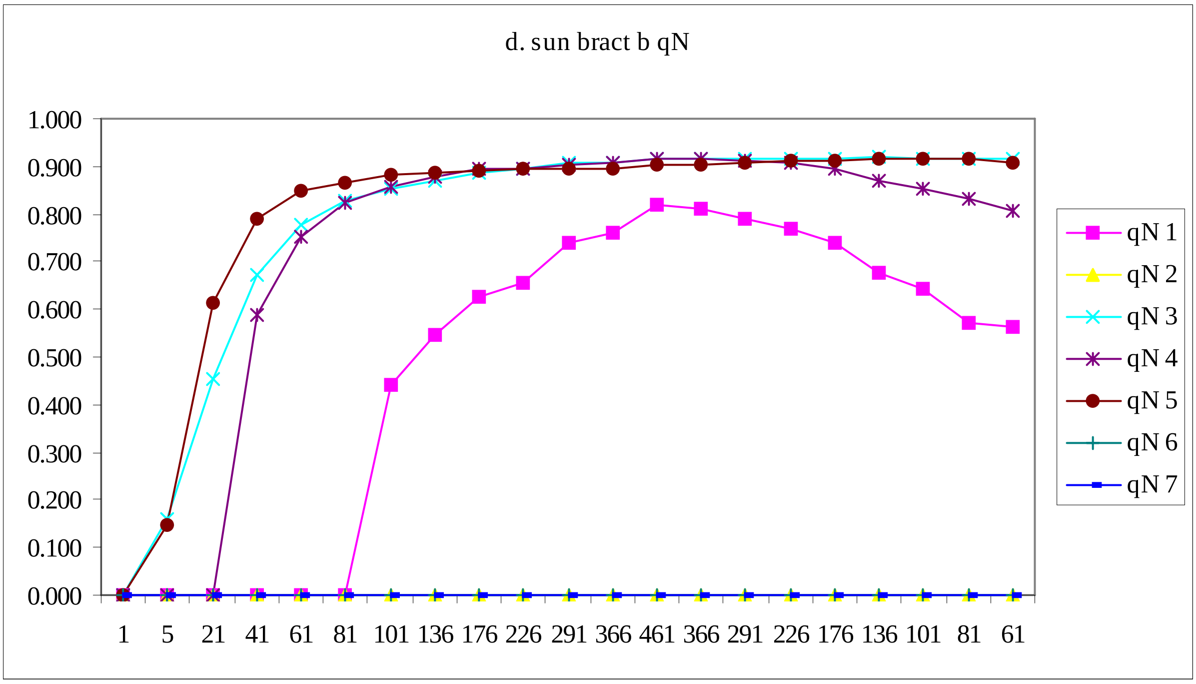

Figure A4.6d: Non-photochemical quenching (qN) (qN of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in additional chlorophyll fluorescence images (not presented).

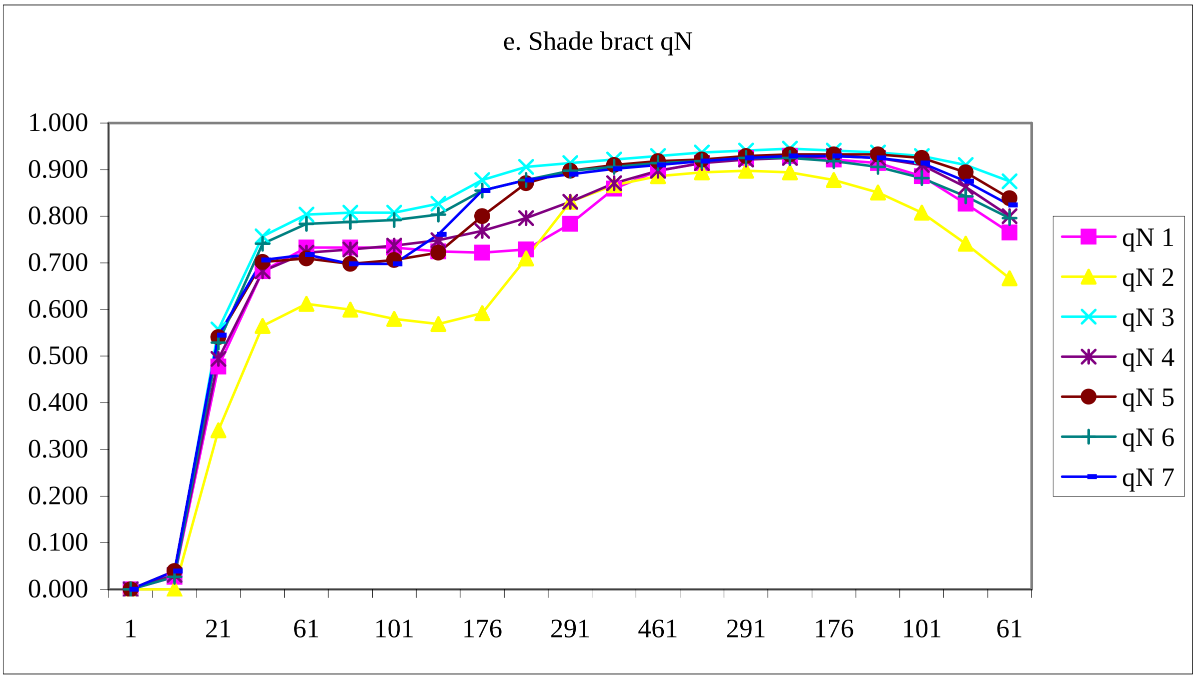

Figure A4.6e: Non-photochemical quenching (qN) (qN of 0.0 to 1.0) from low to moderate light intensities and recovery to low light intensities (PAR of 1 to 461 to 61 µmolm^{-2}s^{-1}) from areas of interest defined in chlorophyll fluorescence images presented in Figure 7.43.

A5 Lipid peroxidation measurements

Table A5.1: Absorbance data for solutions (± thiobarbituric acid, TBA)) and malionaldehyde (MDA) calculations by method of Hodges *et al.* (1999) and Heath and Packer (1968) for samples shown in Appendix Figure A5.1.

	Absorbance of +TBA soln			Absorbance of -TBA soln			Hodges	Hodges	Hodges	Heath and Packer
Samples	600nm	532nm	440nm	600nm	532nm	440nm	A	B	MDA (nmol/mL/cm^2)	MDA (nmol/cm^3)
39L	1.48	5.31	18.27	1.16	2.06	5.21	2.93	0.96	7.98	15.72
39L	1.24	4.37	11.45	1.23	2.16	5.94	2.20	0.58	6.56	12.85
262L	0.88	3.31	7.65	1.68	3.11	6.70	1.00	0.39	2.49	9.98
262L	1.55	6.09	19.74	1.53	3.54	5.87	2.53	1.04	6.05	18.65
264L	1.86	6.39	18.63	1.54	3.85	5.87	2.23	0.96	5.15	18.60
264L	1.76	6.21	16.76	1.67	4.25	6.47	1.87	0.86	4.12	18.28
40OB	0.99	4.84	50.09	0.29	1.76	2.49	2.38	2.80	-1.73	15.83
40OB	0.33	1.46	10.91	1.20	6.56	6.42	-4.22	0.60	-19.58	4.64
339OB	0.93	4.45	38.15	0.79	4.51	4.60	-0.20	2.13	-9.43	14.45
339OB	0.59	2.48	25.54	0.38	2.16	2.93	0.11	1.42	-5.35	7.78
39IB	0.44	2.50	22.80	0.25	2.67	2.10	-0.36	1.28	-6.63	8.47
39IB	0.32	2.12	15.44	0.54	4.20	3.36	-1.86	0.86	-11.02	7.39
371IB	0.17	2.00	7.44	0.87	6.33	4.15	-3.64	0.42	-16.43	7.51
371IB	0.29	2.49	10.87	1.01	6.79	4.70	-3.59	0.60	-17.00	9.02

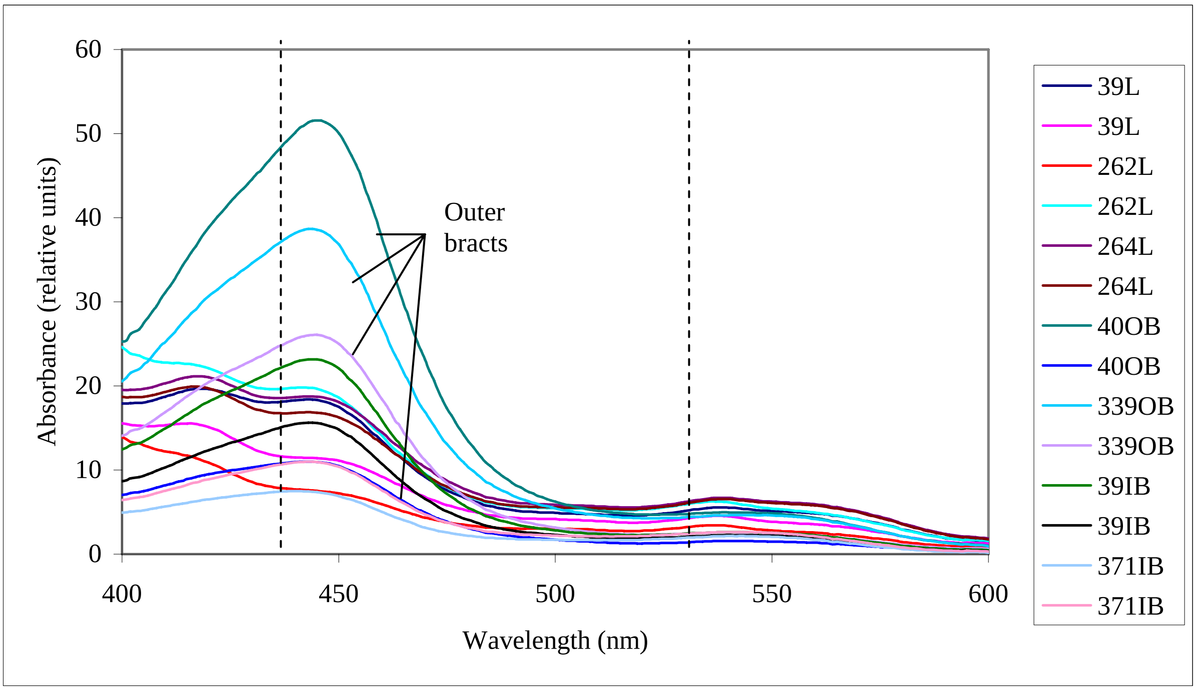

Figure A5.1: Typical absorbance profile of some waratah leaf (L), inner bract (IB) and outer bract (OB) tissues at the juvenile open stage of floral development. Numbers in legend indicate individual plants. Dashed lines approximate the wavelengths used in calculations i.e. 440nm, 532nm; as well as 600nm.