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APPENDICES

APPENDIX

Appendix A Chemicals for Preparation

1. Stock solution

- 0.5 M EDTA (Ph 8.0) [MW = 292.2]	73.05 g	in 500 ml
- 1M Tris-base (Ph 8.0) [MW = 121.4].....	60.57g	in 500 ml
- 20% SDS.....	20g	in100 ml
- 1M NaCl [MW = 58.44]	14.61g	in 250 ml
- 6M NaCl [MW = 58.44]	87.66g	in 250 ml
- Proteinase K [250 mg (296 u/mg)]	10 g/ml	use 10 μ l

2. Reagents

TE

10mM Tris (2ml of 1M Tris-base (pH 8.0) in 200 ml solution

1mM EDTA (0.4 ml of 0.5M EDTA (PH 8.0) in 200 ml solution

TNE + 1%SDS

50mM Tris (10 ml of 1M Tris-base (pH 8.0) in 200 ml solution) .

100 mM NaCl (20ml of 1M NaCl in 200 ml solution)

5 mM EDTA (2 ml of 0.5M EDTA (PH 8.0) in 200 ml solution)

1% (w/v) SDS (10ml of 20% SDS in 200 ml solution)

10XTBE (1L)

0.89M Tris-base (108g)

0.89M boric acid (55g)

0.02M EDTA (40ml of 0.5 M EDTA (pH 8.0) stock solution)

Appendix B Primers tested ISSR PCR

No.	primer	Sequence (5'-3')	No.	primer	Sequence (5'-3')
1	UBC809	(AG)8G	25	T8710	(CA)7YC
2	UBC811	(GA)8C	26	T8711	(CA)7YG
3	UBC827	(AC)8G	27	T8712	(GA)8AT
4	SAS1	(GIG)4C	28	T8713	(CT)8G
5	SAS3	(GAG)4C	29	T8714	(GT)6RG(CT)8T
6	814	(CT)8TG	30	T8715	(GA)6C
7	844A	(CT)8AC	31	T8716	(CA)6C
8	844B	(CT)8GC	32	T8717	(CA)6T
9	17898A	(CA)6AC	33	T8718	(GA)6T
10	17898B	(CA)6GT	34	UBC-813	(CT)8T
11	17899A	(CA)6AG	35	UBC-824	(CT)8G
12	HB12	(AC)3GC	36	UBC-845	(CT)8RG
13	HB13	(GAG)3GC	37	UBC-840	(GA)8YT
14	HB14	(CTC)3GC	38	UBC-848	(CA)8RG
15	HB15	(GIG)3GC	39	TL01	(CAG)5
16	T8701	(CT)8RA	40	TL02	(CAA)5
17	T8702	(AG)7YC	41	TL03	(GACA)4
18	T8703	(GT)6YR	42	TL04	(GATA)4
19	T8704	(GT)6AY	43	UBC812	(GA)8A
20	T8705	CAA(AG)5	44	UBC826	(AC)8C
21	T8706	GGGC(GA)8	45	UBC841	(GA)8YC
22	T8707	(GAG)4RC	46	UBC857	(AC)8YC
23	T8708	(GA)7RG	47	UBC818	(CA)8G
24	T8709	(GT)7YG	48	UBC868	(GAA)6

Appendix C Multiple sequence alignment of 16SrRNA gene of *B. areolata*

		10	20	30	40	50
Rust		AACGGCCGCG	GTACTCTGAC	CGTGCAAAGG	TAGCATAATC	ATTTGCCTTA
White		AACGGCCGCG	GTTCCCTGAC	CGTGCAAAGG	TAGCATAATC	ATTTGCCTTA
Brown		AACGGCCGCG	GTACTCTGAC	CGTGCAAAGG	TAGCATAATC	ATTTGCCTTA
Orange		AACGGCCGCG	GTACTCTGAC	CGTGCAAAGG	TAGCATAATC	ATTTGCCTTA
Tab		AACGGCCGCG	GTACTCTGAC	CGTGCAAAGG	TAGCATAATC	ATTTGCCTTA
Clustal Co		*****	** * *****	*****	*****	*****
		60	70	80	90	100
Rust		TAATTGAAGG	CTGGTATGAA	TGGTTTGACA	AGAATATAGC	TGTCTCTTTA
White		TAATTGAAGG	CTGGTATGAA	TGGTTTGACA	AGAATATAGC	TGTCTCTTTA
Brown		TAATTGAAGG	CTGGTATGAA	TGGTTTGACA	AGAATATAGC	TGTCTCTTTA
Orange		TAATTGAAGG	CTGGTATGAA	TGGTTTGACA	AGAATATAGC	TGTCTCTTTA
Tab		TAATTGAAGG	CTGGTATGAA	TGGTTTGACA	AGAATATAGC	TGTCTCTTTA
Clustal Co		*****	*****	*****	*****	*****
		110	120	130	140	150
Rust		TAATTTGCTA	GAATTTTATT	TGTAAGTGAA	GAAGCTTACA	TAAAATTGAA
White		TAATTTGCTA	GAATTTTATT	TGTAAGTGAA	GAAGCTTACA	TAAAATTGAA
Brown		TAATTTGCTA	GAATTTTATT	TGTAAGTGAA	GAAGCTTACA	TAAAATTGAA
Orange		TAATTTGCTA	GAATTTTATT	TGTAAGTGAA	GAAGCTTACA	TAAAATTGAA
Tab		TAATTTGCTA	GAATTTTATT	TGTAAGTGAA	GAAGCTTACA	TAAAATTGAA
Clustal Co		*****	*****	*****	*****	*****
		160	170	180	190	200
Rust		GGACAAGAAG	ACCCTATCGA	GCTTTAAAAA	AACTAGCGGA	TTAAGAAATT
White		GGACAAGAAG	ACCCTATCGA	GCTTTAAAAA	AACTAGCGGA	TTAAGAAATT
Brown		GGACAAGAAG	ACCCTATCGA	GCTTTAAAAA	AACTAGCGGA	TTAAGAAATT
Orange		GGACAAGAAG	ACCCTATCGA	GCTTTAAAAA	AACTAGCGGA	TTAAGAAATT
Tab		GGACAAGAAG	ACCCTATCGA	GCTTTAAAAA	AACTAGCGGA	TTAAGAAATT
Clustal Co		*****	*****	*****	*****	*****
		210	220	230	240	250
Rust		ATTT-ATAAA	A-AACAATCC	ACTAGACATT	TTAGTTGGGG	CGACTGAGGA
White		ATTT-ATAAA	A-AACAATCC	ACTAGACATT	TTAGTTGGGG	CGACTGAGGA
Brown		ATTT-ATAAA	A-AACAATCC	ACTAGACATT	TTAGTTGGGG	CGACTGAGGA
Orange		ATTT-ATAAA	A-AACAATCC	ACTAGACATT	TTAGTTGGGG	CGACTGAGGA
Tab		ATTT-ATAAA	A-AACAATCC	ACTAGACATT	TTAGTTGGGG	CGACTGAGGA
Clustal Co		**** *	* *****	*****	*****	*****
		260	270	280	290	300
Rust		ACAAAAAAG	CTTCCTTTAA	GGTATTAGAT	AAACGCACGA	GTATTGATCC
White		ACAAAAAAG	CTTCCTTTAA	GGTATTAGAT	AAACGCACGA	GTATTGATCC
Brown		ACAAAAAAG	CTTCCTTTAA	GGTATTAGAT	AAACGCACGA	GTATTGATCC
Orange		ACAAAAAAG	CTTCCTTTAA	GGTATTAGAT	AAACGCACGA	GTATTGATCC
Tab		ACAAAAAAG	CTTCCTTTAA	GGTATTAGAT	AAACGCACGA	GTATTGATCC
Clustal Co		*****	*****	*****	*****	*****

	310	320	330	340	350
Rust	AGAAATTTTG	ATTAAAGGAA	ATAGTTACCG	TAGGGATAAC	AGCATAATCT
White	AGAAATTTTG	ATTAAAGGAA	ATAGTTACCG	TAGGGATAAC	AGCATAATCT
Brown	AGAAATTTTG	ATTAAAGGAA	ATAGTTACCG	TAGGGATAAC	AGCATAATCT
Orange	AGAAATTTTG	ATTAAAGGAA	ATAGTTACCG	TAGGGATAAC	AGCATAATCT
Tab	AGAAATTTTG	ATTAAAGGAA	ATAGTTACCG	TAGGGATAAC	AGCATAATCT
Clustal Co	*****	*****	*****	*****	*****

	360	370	380	390	400
Rust	TTTTTAAGAG	CCCATATCGA	AAAAAAGGTT	TGTGACCTCG	ATGTTGGACC
White	TTTTTAAGAG	CCCATATCGA	AAAAAAGGTT	TGTGACCTCG	ATGTTGGACC
Brown	TTTTTAAGAG	CCCATATCGA	AAAAAAGGTT	TGTGACCTCG	ATGTTGGACC
Orange	TTTTTAAGAG	CCCATATCGA	AAAAAAGGTT	TGTGACCTCG	ATGTTGGACC
Tab	TTTTTAAGAG	CCCATATCGA	AAAAAAGGTT	TGTGACCTCG	ATGTTGGACC
Clustal Co	*****	*****	*****	*****	*****

	410	420	430	
Rust	AGAATATCCT	GAAGATGTAG	CAGTCTTTAA	GGGTTGG
White	AGAATATCCT	GAAGATGTAG	CAGTCTTTAA	GGGTTGG
Brown	AGAATATCCT	GAAGATGTAG	CAGTCTTTAA	GGGTTGG
Orange	AGAATATCCT	GAAGATGTAG	CAGTCTTTAA	GGGTTGG
Tab	AGAATATCCT	GAAGATGTAG	CAGTCTTTAA	GGGTTGG
Clustal Co	*****	*****	*****	*****

Appendix D Multiple sequence alignment of COI gene of *B. areolata*

	10	20	30	40	50
White3	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Orange3	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
White1	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Rust2	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Rust3	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Orangel	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Orange2	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Brown2	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
White2	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Rust1	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Brown1	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Stripe3	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Stripe2	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Brown3	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Stripel	TTAATTCTAC	CTGGCTTTGG	GATAATTTCA	CATATTGTTA	GTCACTATTC
Clustal Co	*****	*****	*****	*****	*****

	60	70	80	90	100
White3	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Orange3	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
White1	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Rust2	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Rust3	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Orangel	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Orange2	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Brown2	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
White2	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Rust1	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Brown1	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Stripe3	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Stripe2	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Brown3	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Stripel	AAGAAAGAAA	GAAACTTTTG	GTACTCTTGG	AATAATCTAT	GCAATATTAG
Clustal Co	*****	*****	*****	*****	*****

	110	120	130	140	150
White3	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Orange3	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
White1	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Rust2	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Rust3	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Orangel	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Orange2	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Brown2	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
White2	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCACCATAT	ATTCACGGTG
Rust1	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Brown1	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Stripe3	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Stripe2	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Brown3	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Stripel	CTATTGGTGT	CTTGGGTTTT	ATTGTTTGGG	CTCATCATAT	ATTCACGGTG
Clustal Co	*****	*****	*****	*****	*****

	160	170	180	190	200
White3	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Orange3	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
White1	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Rust2	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Rust3	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Orange1	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Orange2	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Brown2	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
White2	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Rust1	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Brown1	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Stripe3	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Stripe2	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Brown3	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Stripe1	GGAATGGATG	TAGATACGCG	AGCATATTTTC	ACAGCAGCCA	CTATAATTAT
Clustal Co	*****	*****	*****	*****	*****

	210	220	230	240	250
White3	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Orange3	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
White1	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Rust2	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Rust3	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Orange1	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Orange2	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Brown2	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
White2	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Rust1	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Brown1	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Stripe3	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Stripe2	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Brown3	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Stripe1	TGCCGTACCT	ACGGGTATTA	AGGTTTTTTAG	TTGATTAGCT	ACAATTCACG
Clustal Co	*****	*****	*****	*****	*****

	260	270	280	290	300
White3	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Orange3	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
White1	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Rust2	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Rust3	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Orange1	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Orange2	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Brown2	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
White2	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Rust1	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Brown1	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Stripe3	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Stripe2	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Brown3	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Stripe1	GGGCTAAAAT	TAAATATGAA	ACTCCTATAC	TGTGGGCTTT	GGGGTTCATT
Clustal Co	*****	*****	*****	*****	*****

	310	320	330	340	350
White3	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Orange3	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Whitel	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Rust2	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Rust3	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Orange1	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Orange2	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Brown2	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
White2	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Rust1	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Brown1	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Stripe3	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Stripe2	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Brown3	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Stripe1	TTTCTGTTCA	CTCTTGGAGG	ATTAAGTGGG	ATTATATTAT	CAAACCTCTTC
Clustal Co	*****	*****	*****	*****	*****

	360	370	380	390	400
White3	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Orange3	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Whitel	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Rust2	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Rust3	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Orange1	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Orange2	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Brown2	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
White2	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Rust1	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCA	CACCTTTCATT
Brown1	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCG	CACCTTTCATT
Stripe3	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCG	CACCTTTCATT
Stripe2	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCG	CACCTTTCATT
Brown3	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCG	CACCTTTCATT
Stripe1	TTTAGATATT	ATATTACATG	ATACATATTA	TGTCGTAGCG	CACCTTTCATT
Clustal Co	*****	*****	*****	*****	*****

	410	420	430	440	450
White3	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Orange3	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Whitel	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Rust2	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Rust3	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Orange1	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Orange2	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Brown2	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
White2	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Rust1	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Brown1	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Stripe3	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Stripe2	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Brown3	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Stripe1	ATGTTCTTTC	CATGGGGGCC	GTTTTTGCTC	TATTCGGAGC	TTTTAACTAT
Clustal Co	*****	*****	*****	*****	*****

	460	470
White3	TGATTCCCAC	TCCTAACTGG
Orange3	TGATTCCCAC	TCCTAACTGG
White1	TGATTCCCAC	TCCTAACTGG
Rust2	TGATTCCCAC	TCCTAACTGG
Rust3	TGATTCCCAC	TCCTAACTGG
Orange1	TGATTCCCAC	TCCTAACTGG
Orange2	TGATTCCCAC	TCCTAACTGG
Brown2	TGATTCCCAC	TCCTAACTGG
White2	TGATTCCCAC	TCCTAACTGG
Rust1	TGATTCCCAC	TCCTAACTGG
Brown1	TGATTCCCAC	TCCTAACTGG
Stripe3	TGATTCCCAC	TCCTAACTGG
Stripe2	TGATTCCCAC	TCCTAACTGG
Brown3	TGATTCCCAC	TCCTAACTGG
Stripe1	TGATTCCCAC	TCCTAACTGG
Clustal Co	*****	*****

Appendix E ISSR primers, approximate band size (bp) and profiles obtained for 48 shell color patterns analyze

Primer	UBC 841					UBC845						814					T 8707				
	950	750	620	500	460	920	500	370	350	330	1300	870	700	530	450	390	610	550	520	500	410
1.white1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	1	0
2.white2	0	1	1	1	0	1	1	1	0	1	1	1	0	0	1	0	1	0	0	1	0
3.white3	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0
4.white4	0	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	1	0	1	0
5.White5	1	1	0	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	1
6.white6	1	1	0	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0	0	1	1
7.white7	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1
8.white8	1	1	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	1	1
9.white9	0	1	0	1	0	1	1	1	0	1	1	1	0	1	1	1	1	0	0	1	1
10.orange1	0	1	1	1	0	1	1	1	0	1	1	1	0	0	1	0	1	1	0	1	1
11.orange2	0	1	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1	0	0	1	0
12.orange3	0	1	1	1	0	1	1	0	0	1	1	1	0	0	1	0	1	1	0	1	0

Primer	UBC 841					UBC845					814					T 8707					
	950	750	620	500	460	920	500	370	350	330	1300	870	700	530	450	390	610	550	520	500	410
13. orange4	0	1	0	1	0	1	1	1	1	0	1	1	0	1	1	0	1	1	0	1	0
14. orange5	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1
15. orange6	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	1	1
16. orange7	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	0
17. orange8	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
18. orange9	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	0	1	0
19. orange10	0	1	0	1	0	1	0	1	1	1	1	1	0	0	1	1	1	0	0	1	1
20. rust1	0	1	0	1	0	0	1	1	0	1	1	1	1	0	1	1	1	0	0	1	1
21. rust2	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
22. rust3	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1	0	1	1	0
23. rust4	0	1	0	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	0
24. rust5	0	1	0	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	1

Primer	UBC 841					UBC845					814					T 8707					
	950	750	620	500	460	920	500	370	350	330	1300	870	700	530	450	390	610	550	520	500	410
25.rust6	1	1	0	1	1	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	0
26.rust7	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1
27.rust8	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1
28.rust9	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1
29.rust10	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	0	0	1	1
30.stripe1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1
31.stripe2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1
32.stripe3	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1
33.stripe4	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
34.stripe5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1
35.stripe6	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	1	1
36.stripe7	0	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	1	1	1	1	1

Primer	UBC 841					UBC845					814					T 8707					
	color/bp	950	750	620	500	460	920	500	370	350	330	1300	870	700	530	450	390	610	550	520	500
37.stripe8	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1
38.stripe9	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	0
39.brown1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	1	1	1	0	0	1	1
40.brown2	0	1	0	1	1	0	1	1	0	1	1	1	0	1	1	1	1	0	0	1	1
41.brown3	0	1	0	1	0	1	0	1	1	1	1	1	1	0	1	0	1	0	0	1	0
42.brown4	0	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1
43.brown5	0	1	0	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0	1	1
44.brown6	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
45.brown7	0	1	0	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	0	1	1
46.brown8	0	1	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1	0	0	1	1
47.brown9	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0
48.brown10	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	0	0	1	1

BIOGRAPHY

Miss Kwanpisut Sungsinleart was born on 20 of September 1980 in Amphur Muang Songkhla. She graduated from Bachelor's Degree of science Major Bioproduction in 2003 Faculty Technology and Management, Prince of Songkhla University, Surat Thani Campus. She continued her graduated study for Master's Degree of Department of Marine Science Faculty of Science Chulalongkorn University in 2004.