









# APPENDIX A

## SEQUENCE DATA





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0 5' CACACACACACACACTGGACGCATATAATCAAGCATAACAAGAATAT  
50 GATCAAGCATAACAAAATGATACATGTAAGTGACATATAACAACATGTA  
100 ACCAATCATACAATGATCATGATGCATCCCACAACAACAACCGCAACT  
150 TCCACATGGAGACACCACTACAACCATGATCAACACTAGACATTGTAA  
200 TAGGCAGATGGAATGCAAGCGTAAGAGGCATACATGAAACCAACATGC  
250 ATTCATTAACAATGCACACAACCCATTCAGTTCGAGGGGTGAACCATG  
300 CTTTCGATATGAATCTGTAACACCCTCCGCCACATCTACCCAAGTAAC  
350 CAACCAACTGCGGTAAACATGCGACGAGAGGATACCATGATGAGATTC  
400 AACCTCCTAGGTGACCTTAAGGAAATGGAATGAAAGGAAAAACAACAT  
450 ACAGACCTTCCACATCAGCTATAGCACCCCTTGACCTCGTCC 3'

**Figure A-1. RAMs Sequence 1.** Development of primers JD1-AMO and JD2-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD1-AMO forward primer sequence;  represents the JD1-AMO reverse primer sequence;  represents the JD2-AMO forward primer sequence; and  represents the JD2-AMO reverse primer sequence.








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0 5' CACACACACACACATAAATTTAATATTTTTGGGGTTATAATGTAAT  
50 GTTATGTTGACATGACAACATCTCGGCCTCATATTTTTGTTTTAATGT  
100 AACATTATGTTTTTTTTTCTCTATAAAAGCTATTCGTATTGAACTA  
150 GTAAACATGATAATATTACATGAGGTAGGCGGCTGCAGAAGCCCGCAC  
200 TTGCTAATACTTTACAAAATTTCCCCATTACAGAAGAGATGGGGAATC  
250 TCAACAAAATAACAGCCAATCAATTGACGTTACAAACATACTGAGA  
300 GAGGAAGAACTGAAAATAAGCATATGACCGGAGCTGAAGAACCCTTGA  
350 CCTCGTACCCGCTGGTT 3'

**Figure A-2. RAMs Sequence 2.** Development of primers JD3-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD3-AMO forward primer sequence; and  represents the JD3-AMO reverse primer sequence.





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0 5' CACACACACACACACAAAAAACTATAAAATTTTAATAAAAACAATCT  
 50 TTTTTTTTTTGTAGGCAAAGGTAGTGCATCTCATTCTATTAACATA  
 100 TCAGAAAATTACATCAAAATTAGTGGACCAGCTACCCGCCACCAGGG  
 150 GAAACCGAGTAGGGTATCCACCTAAAGTTTTTAACACCATACCAAAAA  
 200 AAGAAGTCACGTAGTCTCTTTTTCTGGCTAAATAGACATTACAGTCC  
 250 TTCCCTGGTCTAATTCTAGTGATATGCATATATAAACTGTCCATTACA  
 300 AAAAGAGGGAAGCTGCCTAAAGTATCTAAACACCGCAAAATCATCAGA  
 350 AGGGAGACAAGAACTAAAATATTCAACAGCATTGGCAAAGATTGGAG  
 400 AGTCCTCCTTGGAGCTCCTCTGCTGGCTGGCTTGAGCAATTTCTGAAT  
 450 CTCTTCCAGCTGCTT 3'





**Figure A-3. RAMs Sequence 3.** Development of primers JD4-AMO and JD9-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD4-AMO forward primer sequence;  represents the JD4-AMO reverse primer sequence;  represents the JD9.1-AMO forward primer sequence;  represents the JD9.2-AMO forward primer sequence; and  represents the JD9-AMO reverse primer sequence.

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


0 5' CACACACACACACACATAGCAAACAAGATAATCAAGGAGTTCACCCA  
 50 AACTCCTGGGCTACATCTCCTGGTCCAACCTTCAGTAGTGACCTCTC  
 100 TATTATGTCTTTAAGAATATAATTTTACAAAAGAGAGCTCAATTTGAG  
 150 TCTCACACAACAGATACAAAACAACAAGGCTTTACTTGGATACCCCAA  
 200 GTCTTTCTGAGTACACAACTCTCCTCACTGACTCTCTGTCTCCGTTT  
 250 TCTCTCTGTCTCAACAGTGCTTGCCTCTGTCTCTATCATTAGTGGCT  
 300 TTTAAGCCAATTGGCGTTGTCCTGCTCGTTTCCTCTTCTGGGCTTTCT  
 350 GGCCCTTGACCTCGTCCCGCTGGTT 3'

**Figure A-4. RAMs Sequence 4.** Development of primers JD5-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD5-AMO forward primer sequence; and  represents the JD5-AMO reverse primer sequence.






0 5' CACACACACACACACACACACACACCATATAAAAATCTGTATGAATGATTAAA  
 50 TGTGAaAATACATTGATTTTGTAAATGATTGACACATCTTCCAAATTG  
 100 GAAATATGGGTATGTTTTAGGAATATTTAGTGTCTTGGACAAACGCC  
 150 TAACCCTCTAGATCTAATAGCAGGTCTAGAAACAACAACAAAGTAAT  
 200 CTC AACCTTTTCTATAATCAATAGATAAAA CAAGAGAGAAGAGAAACC  
 250 TACTTGTAGTTTTCGCCAGCGCCTTGTCTCCCTTGACCTCGTCCCGCT  
 300 GGTT 3'

**Figure A-5. RAMs Sequence 5.** Development of primers JD6-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD4-AMO forward primer sequence; and  represents the JD4-AMO reverse primer sequence.





0 5' CACACACACACACACACATAACACAGCAAGATAATCAAGGAGTTCACC  
 50 CAAGACTCCTGGGCTACATCTCCTAGTCCAGCCTTCAGTGGTGACCTC  
 100 TCTATTATGTCTTCAAGAGCGGAGTTTTACAAA GTGAGCTCAATTTG  
 150 AGTCTCACACAATAGATACAAA TAACAAGGCTTTACTTGGATCCCCC  
 200 AAGTCTTTCTGAGTACACAGATTCTCCTCACTAACTCTCTATCTCAGC  
 250 ACTTCTTGTCCTGTCTCTGTCAATTCTACGGCTTTTAAGCCAATGGGT  
 300 GTTGTCTGTTTCGTTTCCTCTTTGGGTTCTCTGGCCCTTGACCTCGTCC  
 350 CGCTGGTT 3'

**Figure A-6. RAMs Sequence 6.** Development of primers JD7-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD7.1-AMO forward primer sequence;  represents the JD7.2-AMO forward primer sequence; and  represents the JD7-AMO reverse primer sequence.

0 CACACACACACACATGGACGCATATAATCAAGCATAACAAGAATATG  
50 ATCAAGCATAACAAAATGATACATGTAAGTGACATATAACAACAATGTAA  
100 CCAATCATAACAATGATCATGATGCATCCACACAACAACCGCAACTT  
150 CCACATGGAGACACCCTACAACCATGATCAACACTAGACATTGTAAT  
200 AGGCAGATGGAATGCAAGCGTAAGAGGCATACATGAAACCAACATGCAT  
250 TCATTAACAATGCACACAACCCATTTCAGTTCGAGGGGTGAACCATGCT  
300 TCGATATGAATCTGTAACACCCTCCGCCACATCTACCCAAGTAACCA  
350 ACCAACTGCGGTAACATGCGACGAGAGGATACCATGATGAGATTCAA  
400 CCTCCTAGGTGACCTTAAGGNAATGGAATGAAAGGAAAAACAACATAC  
450 AGACCTTCCACATCAGCTATAGCACCCCTTGACCTCGTCCCGCTGGTT

**Figure A-7. RAMs Sequence 7.** Development of primers JD8-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD8-AMO forward primer sequence;  represents the JD8.1-AMO reverse primer sequence; and  represents the JD8.2-AMO reverse primer sequence.

0 5'CACACACACACACAGAGAATTGCAACTAGTTGCAGCAGCGCGAAAG  
50 GCGTCATTGGTTGTCTGAGGGCCTCCTGCATTTCTTCAATCGACATT  
100 CGGTGAACGGAATGATGGAACAAGAAAGAAGGCTCGGCTTGCAGAGG  
150 AAATGGAAGCTGTGCGGACCAAGGTGGCTGATAGGAAAGGTAAGGGA  
200 TTGCGAAAGAGGAGGTCCCGGACGATTTCCCTGAGGTCCAGACACTT  
250 CAGACGAGGGAGGGAGCAGCGACCCGAGTATGAATGCTGAAGAGTGGG  
300 AACGGTATGCCATGGGTGTCAGTATGAGGAGCCGGCGTGGTCGAAGGG  
350 TTCCTACGCGCGGGCGACGGAGGCGGGTCAATCACAATGGCTGCGAGA  
400 CTGCTCCCAACCGTGGTCAGAACAACGCGGCCAGT 3'



**Figure A-8. RAMs Sequence 8.** Development of primers JD10-AMO. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences;  represents the JD10-AMO forward primer sequence;  represents the JD10-AMO reverse primer sequence.



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0 CACACACACACACACATAACACAGCAAGATAATCAAGGAGTTCACC  
50 CAAGACTCCTGGGCTACATCTCCTAGTCCAGCCTTCAGTGGTGACCTC  
100 TCTATTATGTCTTCAAGAGCGGAGTTTTACAAAAGTGAGCTCAATTT  
150 GAGTCTCACACAATAGATACAAAATAACAAGGCTTTACTTGGATCCCC  
200 CAAGTCTTTCTGAGTACACAGATTCTCCTCACTAACTCTCTATCTCAG  
250 CACTTCTTGTCCCTGTCTCTGTC



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**Figure A-9. RAMs Sequence 9.** No Primers developed for this sequence. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences.

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0 5' CACACACACACACACATAACCATGTA ACTTGCCTCCAGGAAACACCT  
50 TCGTGCAGTGACCCGACCTCCCTACCCTTGGTTCTTCACACCTTTGTG  
100 TTGCCACCTGACTCTAGTGAACATTGTTCTACCACAGGTCTGAACATG  
150 GCCAATGTTGTACAACCTAATTGTTGAACTGTTTACATGTCGATTATC  
200 CTTCCATAGAAACCCCAA 3'

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**Figure A-10. RAMs Sequence 10.** No primers developed for this sequence. Where:  represents the CA<sub>8</sub> RAMs primer sequence;  represents the microsatellite sequences.



# APPENDIX B

## ANOVA TABLES

**Table B-1.** Results of ANOVA where the eighteen pollen types were compared based on the dimensional measurement AA.

	A22	A24	A29	A31	A33	A49	A57	A65	A91	A93	A114	A271	Ac60	Ac62	P23	P69	P88	P105
<b>A22</b>	NA	/	/	/	/	/	*	/	/	*	/	*	/	*	*	*	/	/
<b>A24</b>	/	NA	/	/	*	/	*	*	*	*	*	*	/	*	*	*	*	/
<b>A29</b>	/	/	NA	/	/	/	*	/	/	*	/	/	/	/	*	/	/	/
<b>A31</b>	/	/	/	NA	/	/	*	/	/	*	*	*	/	*	*	*	/	/
<b>A33</b>	/	*	/	/	NA	/	*	/	/	*	/	/	*	/	*	/	/	/
<b>A49</b>	/	/	/	/	/	NA	*	/	/	*	/	*	/	*	*	*	/	/
<b>A57</b>	*	*	*	*	*	*	NA	*	*	*	*	*	*	*	*	*	*	*
<b>A65</b>	/	*	/	/	/	/	*	NA	/	*	/	/	/	/	*	/	/	/
<b>A91</b>	/	*	/	/	/	/	*	/	NA	*	/	/	/	/	*	/	/	/
<b>A93</b>	*	*	*	*	*	*	*	*	*	NA	*	*	*	*	/	/	*	*
<b>A114</b>	/	*	/	*	/	/	*	/	/	*	NA	/	*	/	*	/	/	*
<b>A271</b>	*	*	/	*	/	*	*	/	/	*	/	NA	*	/	*	/	/	*
<b>Ac60</b>	/	/	/	/	*	/	*	/	/	*	*	*	NA	*	*	*	/	/
<b>Ac62</b>	*	*	/	*	/	*	*	/	/	*	/	/	*	NA	*	/	/	*
<b>P23</b>	*	*	*	*	*	*	*	*	*	/	*	*	*	*	NA	*	*	*
<b>P69</b>	*	*	/	*	/	*	*	/	/	/	/	/	*	/	*	NA	/	*
<b>P88</b>	/	*	/	/	/	/	*	/	/	*	/	/	/	/	*	/	NA	/
<b>P105</b>	/	/	/	/	/	/	*	/	/	*	*	*	/	*	*	*	/	NA

\* = Significantly different



**Table B-2.** Results of ANOVA where the eighteen pollen types are compared based on the dimensional measurement BB.

	A22	A24	A29	A31	A33	A49	A57	A65	A91	A93	A114	A271	Ac60	Ac62	P23	P69	P88	P105
A22	NA	/	*	*	*	*	/	/	/	/	/	/	*	/	/	/	/	/
A24	/	NA	/	/	/	/	*	/	/	/	/	/	/	/	/	*	*	/
A29	*	/	NA	/	/	/	*	*	/	*	*	*	/	/	*	*	*	/
A31	*	/	/	NA	/	/	*	*	/	*	*	*	/	*	*	*	*	/
A33	*	/	/	/	NA	/	*	*	/	*	*	*	/	*	*	*	*	/
A49	*	/	/	/	/	NA	*	*	/	*	*	*	/	*	*	*	*	/
A57	/	*	*	*	*	*	NA	/	*	/	/	/	*	*	/	/	/	*
A65	/	/	*	*	*	*	/	NA	*	/	/	/	*	/	/	/	/	/
A91	/	/	/	/	/	/	*	*	NA	*	/	/	/	/	*	*	*	/
A93	/	/	*	*	*	*	/	/	*	NA	/	/	*	/	/	/	/	/
A114	/	/	*	*	*	*	/	/	/	/	NA	/	*	/	/	/	/	/
A271	/	/	*	*	*	*	/	/	/	/	/	NA	*	/	/	/	*	/
Ac60	*	/	/	/	/	/	*	*	/	*	*	*	NA	*	*	*	*	/
Ac62	/	/	/	*	*	*	*	/	/	/	/	/	*	NA	/	/	*	/
P23	/	/	*	*	*	*	/	/	*	/	/	/	*	/	NA	/	/	*
P69	/	*	*	*	*	*	/	/	*	/	/	/	*	/	/	NA	/	*
P88	/	*	*	*	*	*	/	/	*	/	/	*	*	*	/	/	NA	*
P105	/	/	/	/	/	/	*	/	/	/	/	/	/	/	*	*	*	NA

\* = Significantly different

**Table B-3.** Results of ANOVA where the eighteen pollen types are compared based on the dimensional measurement CC.

	A22	A24	A29	A31	A33	A49	A57	A65	A91	A93	A114	A271	Ac60	Ac62	P23	P69	P88	P105
<b>A22</b>	NA	/	/	*	/	*	*	/	/	*	*	/	/	*	*	*	/	*
<b>A24</b>	/	NA	/	/	/	/	*	*	/	*	*	*	/	*	*	*	/	/
<b>A29</b>	/	/	NA	*	/	*	*	/	/	*	*	/	/	*	*	*	/	/
<b>A31</b>	*	/	*	NA	*	/	*	*	*	*	*	*	*	*	*	/	*	/
<b>A33</b>	/	/	/	*	NA	*	*	/	/	*	/	/	/	/	*	*	/	*
<b>A49</b>	*	/	/	/	*	NA	*	*	*	*	*	*	*	*	*	/	*	/
<b>A57</b>	*	*	*	*	*	*	NA	*	*	*	*	*	*	*	/	*	*	*
<b>A65</b>	/	*	/	*	/	*	*	NA	/	/	/	/	/	/	*	/	/	*
<b>A91</b>	/	/	/	*	/	*	*	/	NA	*	*	/	/	*	*	*	/	/
<b>A93</b>	*	*	*	*	*	*	*	/	*	NA	/	/	*	/	/	/	*	*
<b>A114</b>	*	*	*	*	/	*	*	/	*	/	NA	/	*	/	/	/	*	*
<b>A271</b>	/	*	/	*	/	*	*	/	/	/	/	NA	/	/	*	/	/	*
<b>Ac60</b>	/	/	/	*	/	*	*	/	/	*	*	/	NA	*	*	*	/	/
<b>Ac62</b>	*	*	*	*	/	*	*	/	*	/	/	/	*	NA	/	/	*	*
<b>P23</b>	*	*	*	*	*	*	/	*	*	/	/	*	*	/	NA	/	*	*
<b>P69</b>	*	*	*	*	*	*	*	/	*	/	/	/	*	/	/	NA	*	*
<b>P88</b>	/	/	/	*	/	*	*	/	/	*	*	/	/	*	*	*	NA	/
<b>P105</b>	*	/	/	/	*	/	*	*	/	*	*	*	/	*	*	*	/	NA

\* = Significantly different

**Table B-4.** Results of ANOVA where the eighteen pollen types are compared based on the dimensional measurement DD.

	A22	A24	A29	A31	A33	A49	A57	A65	A91	A93	A114	A271	Ac60	Ac62	P23	P69	P88	P105
<b>A22</b>	NA	/	/	/	*	*	*	/	/	/	/	/	*	/	/	/	/	/
<b>A24</b>	/	NA	/	*	*	*	*	/	/	/	/	/	*	/	/	/	/	/
<b>A29</b>	/	/	NA	/	/	/	*	*	/	*	*	*	/	/	*	*	*	/
<b>A31</b>	/	*	/	NA	/	/	*	*	/	*	*	*	/	*	*	*	*	/
<b>A33</b>	*	*	/	/	NA	/	*	*	/	*	*	*	/	*	*	*	*	/
<b>A49</b>	*	*	/	/	/	NA	*	*	/	*	*	*	/	*	*	*	*	/
<b>A57</b>	*	*	*	*	*	*	NA	/	*	/	*	*	*	*	/	*	/	*
<b>A65</b>	/	/	*	*	*	*	*	NA	*	/	/	/	*	/	/	/	/	*
<b>A91</b>	/	/	/	/	/	/	*	*	NA	*	/	/	/	/	*	/	*	/
<b>A93</b>	/	/	*	*	*	*	/	/	*	NA	/	/	*	/	/	/	/	*
<b>A114</b>	/	/	*	*	*	*	*	/	/	/	NA	/	*	/	/	/	/	*
<b>A271</b>	/	/	*	*	*	*	*	/	/	/	/	NA	*	/	/	/	/	*
<b>Ac60</b>	*	*	/	/	/	/	*	*	/	*	*	*	NA	*	*	*	*	/
<b>Ac62</b>	/	/	/	*	*	*	*	/	/	/	/	/	*	NA	/	/	/	/
<b>P23</b>	/	/	*	*	*	*	/	/	*	/	/	/	*	/	NA	/	/	*
<b>P69</b>	/	/	*	*	*	*	*	/	/	/	/	/	*	/	/	NA	/	/
<b>P88</b>	/	/	*	*	*	*	/	/	*	/	/	/	*	/	/	/	NA	*
<b>P105</b>	/	/	/	/	/	/	*	*	/	*	*	*	/	/	*	/	*	NA

\* = Significantly different

**Table B-5.** Results of ANOVA where the eighteen pollen types are compared based on the dimensional measurement EE.

	A22	A24	A29	A31	A33	A49	A57	A65	A91	A93	A114	A271	Ac60	Ac62	P23	P69	P88	P105
A22	NA	/	*	/	*	/	/	/	/	/	/	/	/	/	/	/	/	/
A24	/	NA	/	/	/	/	/	/	/	/	/	/	/	/	*	/	/	*
A29	*	/	NA	/	/	/	*	*	/	/	/	*	*	*	*	*	*	*
A31	/	/	/	NA	/	/	*	*	/	/	/	/	/	*	*	/	/	*
A33	*	/	/	/	NA	/	/	*	/	/	/	*	*	*	*	*	*	*
A49	/	/	/	/	/	NA	*	*	/	/	/	/	/	/	*	/	/	*
A57	/	/	*	*	*	*	NA	/	*	/	/	/	/	/	/	/	/	/
A65	/	/	*	*	*	*	/	NA	*	/	/	/	/	/	/	/	/	/
A91	/	/	/	/	/	/	*	*	NA	/	/	/	/	/	*	/	/	*
A93	/	/	/	/	/	/	/	/	/	NA	/	/	/	/	*	/	/	/
A114	/	/	/	/	/	/	/	/	/	/	NA	/	/	/	/	/	/	/
A271	/	/	*	/	*	/	/	/	/	/	/	NA	/	/	/	/	/	/
Ac60	/	/	*	/	*	/	/	/	/	/	/	/	NA	/	/	/	/	/
Ac62	/	/	*	*	*	/	/	/	/	/	/	/	/	NA	/	/	/	/
P23	/	*	*	*	*	*	/	/	*	*	/	/	/	/	NA	/	/	/
P69	/	/	*	/	*	/	/	/	/	/	/	/	/	/	/	NA	/	/
P88	/	/	*	/	*	/	/	/	/	/	/	/	/	/	/	/	NA	/
P105	/	*	*	*	*	*	/	/	*	/	/	/	/	/	/	/	/	NA

\* = Significantly different



# **APPENDIX C**

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## LIST OF ABBREVIATIONS

<b>ANOVA</b>	Analysis of variance
<b>APS</b>	Ammonium persulphate
<b>bp</b>	Base-pairs
<b>ca.</b>	Approximately
<b>CTAB</b>	Cetyltrimethylammonium bromide
<b>D.E.R. 736</b>	Diglycidyl ether of polypropylene glycerol
<b>DMAE</b>	Dimethylaminoethanol
<b>DNA</b>	Deoxyribonucleic acid
<b>dNTPs</b>	Deoxyribonucleotides
<b>DTT</b>	Dithiothreitol
<b>EDTA</b>	Ethylenediaminetetraacetic acid
<b>ha.</b>	Hectare
<b>HCl</b>	Hydrochloric acid
<b>IPTG</b>	Isopropylthio- $\beta$ -D-galactoside
<b>KCl</b>	Potassium chloride
<b>LB</b>	Luria-Bertani medium
<b>NaCl</b>	Sodium chloride
<b>NaOAc</b>	Sodium acetate
<b>NSA</b>	Nonenyl succinic anhydride
<b>M</b>	Molar
<b>MgCl<sub>2</sub></b>	Magnesium chloride

<b>PC</b>	Principle component
<b>PCA</b>	Principle component analysis
<b>PCR</b>	Polymerase chain reaction
<b>PVP</b>	Polyvinylpyrrolidone
<b>RAMs</b>	Randomly amplified microsatellites
<b>RAPD</b>	Random amplified polymorphic DNA
<b>RFLP</b>	Restriction fragment length polymorphism
<b>SAFCOL</b>	South African Forestry Company Limited
<b>SDS</b>	Sodium dodecyl sulphate
<b>SEM</b>	Scanning electron microscope
<b>SSR</b>	Simple sequence repeats
<b>TAE</b>	Tris-acetate-EDTA buffer
<b>TBE</b>	Tris-borate-EDTA buffer
<b>TEM</b>	Transmission electron microscope
<b>TEMED</b>	N,N,N'N'-tetra-methylethylenediamine
<b>Tris</b>	Tris(hydroxymethyl)-aminomethane
<b>U</b>	One unit of <i>Taq</i> DNA polymerase. i.e. the amount of enzyme required to catalyze the incorporation of 10 nanomoles of dNTPs into acid insoluble material in 30 minutes at 74°C.
<b>UV</b>	Ultraviolet
<b>V</b>	Volts
<b>VCD</b>	Vinyl cyclohexene dioxide



**v/v**

Volume per volume

**XGAL**

5-bromo-4-chloro-3-indolyl- $\beta$ -D-galactoside

**w/v**

Weight per volume