

CURRICULUM VITAE

Zacharias Hendrik Swanevelder was born in Klerksdorp, North-West Province, on 1 June 1978. In 1996 he matriculated at the Hoërskool Verwoerdburg, Gauteng, with five distinctions.

In 1997 he started his tertiary education with an enrolment at the University of South Africa (UNISA). He obtained the degree Baccalaureus Scientiae (*cum laude*) in 1999 (Botany and Biochemistry as majors). The degree Baccalaureus Scientiae Honores, specialising in Plant Physiology, was completed at the University of Pretoria (UP) in 2000 and awarded *cum laude*. During this period he received the Margaretha Mes-Medal for the best honours student in Plant Physiology. In 2000 the University of Pretoria awarded him academic colours for the honours degree.

In 2001 he enrolled for the degree Magister Scientiae in the Department of Botany, University of Pretoria. The following year results obtained from research for this degree were presented as a poster at the SAAB 2002 meeting (“The development of microsatellite markers for population studies of *Clivia miniata* (Amaryllidaceae)”). In the same year he published a paper in the *Clivia* Society’s annual publication (“*Clivia* pollen: function and structure”, *Clivia* 3: 13–15). A paper on the research for his master’s degree was presented at SAAB 2003 (“Chloroplast DNA variation in *Clivia miniata* (Amaryllidaceae)”). This presentation resulted in a third place for the Van Staden Prize for best presentation by a master’s student.

APPENDIX I

RECORDS USED IN THE CONSTRUCTION OF *CLIVIA*

DISTRIBUTION MAPS

This appendix contains the records used in the construction of the various distribution maps used in Chapter 4. Only the reference/collection numbers of the herbaria are given in an attempt to prevent illegal collecting from these sites. Where neither the reference or collection number is known, the collector and collection date are used. The records are divided according to species and records believed to be incorrect are indicated.

Clivia caulescens R.A.Dyer

Reference/collection number, collector and collection date	Herbarium
22301, F.A. Rogers, 11/1917	C.E. Moss Herbarium
K. Balkwill, 30/04/1980	C.E. Moss Herbarium
K. Balkwill, 28/01/1981	C.E. Moss Herbarium
70, J.A. Heymans, 13/03/1993	C.E. Moss Herbarium
994, D.A. McCallum, K. Balkwill & R.A. Reddy, 28/09/2000	C.E. Moss Herbarium
2165, J.P. Rourke, 8/1999	Compton Herbarium
433/99, Live collection	Kirstenbosch NBG
ZH6, PRU92692, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH7, PRU92691, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH8, PRU92690, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH9, PRU92694, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH11, PRU92673, Z.H. Swanevelder, 10/2002	H.G.W.J. Schweickerdt Herbarium
PRU81136, F. Venter, 8/4/1986	H.G.W.J. Schweickerdt Herbarium
PRU13117, J.C. Scheepers, 2/7/1958	H.G.W.J. Schweickerdt Herbarium
PRU12123, J.C. Scheepers, 8/7/1958	H.G.W.J. Schweickerdt Herbarium
PRU45994, N. Grobbelaar, 2/12/1981	H.G.W.J. Schweickerdt Herbarium
PRU7151, G.B. Gouws, 12/1946	H.G.W.J. Schweickerdt Herbarium
3347, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3589, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3590, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3706, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3707, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3708, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
247/1970, J.P. Nel	Lowveld Herbarium
333/1980, J.P. Kluge	Lowveld Herbarium
NH16538.0, F.A. Rogers, 11/1918	Natal Herbarium
NH122108.0, N. Crouch, 7/2/1998	Natal Herbarium
PRE26511, P. van der Merwe, 10/1941	Pretoria Herbarium
1102, E.E. Galpin, 10/1890	Pretoria Herbarium
3937, G.W. Reynolds, 11/1941	Pretoria Herbarium



3937, G.W. Reynolds, 9/1942	Pretoria Herbarium
311, J.E. Repton, 9/10/1929	Pretoria Herbarium
3937, G.W. Reynolds, 25/11/1941	Pretoria Herbarium
4401, R.A. Dyer, 9/10/1941	Pretoria Herbarium
315, Van der Merwe, 7/1/1936	Pretoria Herbarium
446, M. Barnard, 29/12/1944	Pretoria Herbarium
2539, S. Killick, 19/11/1958	Pretoria Herbarium
9977, A.D.J. Meeuse, 3/3/1957	Pretoria Herbarium
3309, D.W. Codd, 12/11/1947	Pretoria Herbarium
7870, L.E.W. Codd, 24/4/1953	Pretoria Herbarium
SKF1476, J.C. Scheepers, 3/1960	Pretoria Herbarium
4862, Van Der Schijf, 12/1959	Pretoria Herbarium
87, P. Germishuizen, 9/1961	Pretoria Herbarium
407, J.C. Scheepers, 2/7/1958	Pretoria Herbarium
407, J.C. Scheepers, 2/7/1958	Pretoria Herbarium
413, J.C. Scheepers, 8/7/1958	Pretoria Herbarium
1639, D.R.J. van Vuuren, 8/11/1963	Pretoria Herbarium
1483, N.H.G. Jacobsen, 5/12/1970	Pretoria Herbarium
200, S. Muller, 24/4/1971	Pretoria Herbarium
2122, P.J. Muller, 9/12/1971	Pretoria Herbarium
TM28287, V.A. Fitzsimons, 11/1925	Pretoria Herbarium
TM13398, Pott-Leendertz, 11/1913	Pretoria Herbarium
224, N.J. van Warmelo, 11/1941	Pretoria Herbarium
1850, O.B. Werderman, 15/1/1959	Pretoria Herbarium
771, L.E. Taylor, 6/8/1935	Pretoria Herbarium
1222, S. Venter, 15/11/1967	Pretoria Herbarium
1230, S. Venter, 15/11/1967	Pretoria Herbarium
31715, R.H. Compton, 26/10/1963	Pretoria Herbarium
1813, J.P. Kluge, 26/3/1979	Pretoria Herbarium
7124, S. Venter, 16/10/1981	Pretoria Herbarium
741, M. Stalmans, 4/11/1985	Pretoria Herbarium
1230, S. Venter, 15/11/1976	Pretoria Herbarium
1222, S. Venter, 15/11/1976	Pretoria Herbarium
11147, S. Venter, 23/10/1985	Pretoria Herbarium
30687, R.H. Compton, 31/8/1961	Pretoria Herbarium
PRE37030, B. Nicholson, 5/9/1938	Pretoria Herbarium
PRE15229, R. Farquharson	Pretoria Herbarium
1102, E. Galpin, 10/1890	Selmar Schonland Herbarium
4183, H.H. Burrows, 27/11/1994	Selmar Schonland Herbarium

Clivia miniata Lindl.

Reference/collection number, collector and collection date	Herbarium
3354, K. Balkwill & M.J. Cadman, 04/10/1986	C.E. Moss Herbarium
814, J. Munday, 04/09/1974	C.E. Moss Herbarium
NBG 176775, J.P. Rourke, Sept. 2000	Compton Herbarium
NBG 176776, J.P. Rourke, Sept 2000	Compton Herbarium
NBG167133, J.P. Rourke, Aug 1999	Compton Herbarium
NBG167029, J.P. Rourke, Sept 1998	Compton Herbarium
J.P. Rourke, Aug 1999	Compton Herbarium
NBG167026, J. Winter, Sept 1996	Compton Herbarium
2143, J.P. Rourke, Sept 1998	Compton Herbarium
NBG 167034, J.P. Rourke, Sept. 1998	Compton Herbarium
431/99, Kirstenbosch live collection	Kirstenbosch NBG



327/00, Kirstenbosch live collection	Kirstenbosch NBG
524/98, Kirstenbosch live collection	Kirstenbosch NBG
520/98, Kirstenbosch live collection	Kirstenbosch NBG
435/99, Kirstenbosch live collection	Kirstenbosch NBG
720/96, Kirstenbosch live collection	Kirstenbosch NBG
436/99, Kirstenbosch live collection	Kirstenbosch NBG
515/98, Kirstenbosch live collection	Kirstenbosch NBG
PSJ729/96, Kirstenbosch live collection	Kirstenbosch NBG
PRU49515, A. Abbott, 18/9/1983	H.G.W.J. Schweickerdt Herbarium
2096, PRU92682, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
ZH3, PRU92698, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
3014, PRU92687, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3107, PRU92688, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3108, PRU92684, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3284, PRU92685, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3611, PRU92683, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3213, PRU92689, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3619, PRU92686, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
ZH1, PRU92697, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH4, PRU92699, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH5, PRU92693, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
ZH12, PRU92676, Z.H. Swanevelder, 10/2002	H.G.W.J. Schweickerdt Herbarium
PRU 91194, A. Hardinge	H.G.W.J. Schweickerdt Herbarium
PRU 91195, A. Hardinge	H.G.W.J. Schweickerdt Herbarium
201/1971, J.P. Nel	Lowveld Herbarium
104/1999, P.J.H. Hurter	Lowveld Herbarium
PRE8724, C.R. Saunders	Pretoria Herbarium
1176, G.T. Thorncroft, 10/1922	Pretoria Herbarium
1192, G.T. Thorncroft, 6/1922	Pretoria Herbarium
2143, H.J.T. Venter, 9/1965	Pretoria Herbarium
1153, E.J. Moll, 9/1964	Pretoria Herbarium
95, P.M. Hitchins, 10/1961	Pretoria Herbarium
A1266, Thode, 9/1927	Pretoria Herbarium
24662R, W.J. Haygarth, 10/1921	Pretoria Herbarium
PRE 37084, J. Admiraal, 8/1960	Pretoria Herbarium
295, H.G. Flanagan, 9/1889	Pretoria Herbarium
8122, R.H. Marloth	Pretoria Herbarium
5746, E.E. Galpin, 9/1900	Pretoria Herbarium
2104, A. Pegler, 9/1914	Pretoria Herbarium
28678, F.A. Rogers	Pretoria Herbarium
6025, R.G. Strey, 9/1965	Pretoria Herbarium
3332(48), N.H.G. Jacobsen, 8/1967	Pretoria Herbarium
465, E.S. Kemp, 11/1976	Pretoria Herbarium
385, C. Reid, 9/1980	Pretoria Herbarium
394, J. Admiraal, 9/1960	Pretoria Herbarium
NH4413.0, J. Medley-Wood, 0/10/0000	Natal Herbarium
NH10104 .1, J. Medley-Wood, 26/9/1904	Natal Herbarium
NH10104 .2, J. Medley-Wood, 26/9/1904	Natal Herbarium
NH11354 .0, Ritchie, 0/10/1906	Natal Herbarium
NH21338 .1, 13/9/1931	Natal Herbarium
NH21338 .2, H.M.L Forbes, 13/9/1931	Natal Herbarium
NH24691 .0, H.J. Thode, 0/9/1927	Natal Herbarium
NH38959 .0, J.G. Lawn, 4/9/1949	Natal Herbarium
NH53214.0, R.G. Strey, 14/9/1965	Natal Herbarium
NH54786.0, E.J. Moll, 30/9/1964	Natal Herbarium
NH66717.1, R.G. Strey, 5/1/1965	Natal Herbarium



NH66717.2, R.G. Strey, 5/1/1965	Natal Herbarium
NH77792.0, A.T.D. Abbott, 18/9/1983	Natal Herbarium
NH87091 .0, M.C. Ward, 11/9/1986	Natal Herbarium
NH103226.0, W.J. Haygarth, 0/0/1921	Natal Herbarium
NH108807.0, H.H. Rudatis, 31/8/1913	Natal Herbarium
NH108808.1, H.H. Rudatis, 31/8/1913	Natal Herbarium
NH108808.2, H.H. Rudatis, 31/8/1913	Natal Herbarium
NH108808.3, H.H. Rudatis, 31/8/1913	Natal Herbarium
NH108816.0, R.W. Adlam, 0/11/1885	Natal Herbarium
NH108850.0, W.J. Haygarth, 0/0/1921	Natal Herbarium
NH108852.1, H.J. Thode, 0/9/1913	Natal Herbarium
NH108852.2, H.J. Thode, 0/9/1913	Natal Herbarium
NH108855.2, H.J. Thode, 0/9/1895	Natal Herbarium
NH108855.1, H.J. Thode, 0/9/1895	Natal Herbarium
NH112693.0, H.J. Thode, 0/0/1913	Natal Herbarium
NH118517.0, E. Cloete, 13/9/1992	Natal Herbarium
NH118765.1, T.B. Sikhakhane, 29/9/1992	Natal Herbarium
NH118765.2, T.B. Sikhakhane, 29/9/1992	Natal Herbarium
168, H.Hutton, 1901	Selmar Schonland Herbarium
E.Bohling, 1958	Selmar Schonland Herbarium
1099, E. Cloete, 25/11/1991	Selmar Schonland Herbarium

Clivia nobilis Lindl.

Reference/collection number, collector and collection date	Herbarium
NBG117000	Compton Herbarium
Kirstenbosch NBI, records with population information	Compton Herbarium
Kirstenbosch NBI, records with population information	Compton Herbarium
J.P Rourke, Sept 2000	Kirstenbosch NBI
3102, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3449, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3484, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3524, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
ZH2, Z.H. Swanevelder, 10/2001	H.G.W.J. Schweickerdt Herbarium
235, E.E. Galpin, 11/1888	Pretoria Herbarium
12781, J.H.P. Acocks (Given as <i>C. gardenii</i> believed to be <i>C. nobilis</i>)	Pretoria Herbarium
6585, Charles, 9/1965	Pretoria Herbarium
E. Galpin, 235, 1888	Selmar Schonland Herbarium
Daly & Sole 323, Oct. 1902	Selmar Schonland Herbarium
Dr Becker, Dec. 1907	Selmar Schonland Herbarium
H. & K. Grant, 32, Sept. 1918	Selmar Schonland Herbarium
G.V. Britten, 731	Selmar Schonland Herbarium
L. Britten, Sept 1947	Selmar Schonland Herbarium
G.V. Britten	Selmar Schonland Herbarium
E. Archibald, 3691, 28/09/1951	Selmar Schonland Herbarium
G. Blackbeard, May 1957	Selmar Schonland Herbarium
A. Martin, 9047, 29/05/1956	Selmar Schonland Herbarium
A. Jacot-Guillarmod, 3507, 05/10/1958	Selmar Schonland Herbarium
L. Starke, 22/12/1966	Selmar Schonland Herbarium
R. Jibb, 1972	Selmar Schonland Herbarium
H. Burrows, 3756, 22/8/1992	Selmar Schonland Herbarium
T. Dold, 1137, 1994	Selmar Schonland Herbarium
E. Cloete, 2602, 6/03/1994	Selmar Schonland Herbarium



H. Burrows, 4115, 17/09/1994	Selmar Schonland Herbarium
K. Hammett, 17/09/1998	Selmar Schonland Herbarium
70/1987, J.P. Kluge	Lowveld Herbarium

Clivia mirabilis Rourke

Reference/collection number, collector and collection date	Herbarium
2220, J.P. Rourke (Type)	Compton Herbarium

Clivia gardenii Hook.

Reference/collection number, collector and collection date	Herbarium
NBG 167016, J.P. Rourke, 6/1999	Compton Herbarium
NBG 167017, JP Rourke, June 1999	Compton Herbarium
NBG 167018, JP Rourke, June 1999	Compton Herbarium
NBG167019, JP Rourke, June 1999	Compton Herbarium
124/99, Live collection	Kirstenbosch NBG
160/99, Live collection	Kirstenbosch NBG
437/99, Live collection	Kirstenbosch NBG
432/99, Live collection	Kirstenbosch NBG
430/99, Live collection	Kirstenbosch NBG
ZH10, PRU92672, Z.H. Swanevelder, 6/2002	H.G.W.J. Schweickerdt Herbarium
3047, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3094, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3095, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
3169, J.T. Truter	H.G.W.J. Schweickerdt Herbarium
52/2000, W.C. Froneman	Lowveld Herbarium
NH 38355 .0, J.G. Lawn, 20/3/1949	Natal Herbarium
NH 38535 .0, J.G. Lawn, 15/5/1949	Natal Herbarium
NH 38537 .0, J.G. Lawn, 2/6/1949	Natal Herbarium
NH 55179.0, R.G. Strey, 8/5/1966	Natal Herbarium
NH 79601.0, I.G. Gordon, 15/6/1982	Natal Herbarium
NH 87481.0, H. Heilgendorff, 10/7/1986	Natal Herbarium
NH 108861.3, H.J. Thode, 1915	Natal Herbarium
NH 108861.1, H.J. Thode, 1915	Natal Herbarium
NH 108861.2, H.J. Thode, 1915	Natal Herbarium
NH 112694.0, H.J. Thode, 1915	Natal Herbarium
NH 121708.0, D.J.B. Killick, 28/5/1949	Natal Herbarium
NH 123140.0, N. Crouch, 27/5/1999	Natal Herbarium
NH 2272.0, J. Medley-Wood, 0/5/1884	Natal Herbarium
NH 11002 .0, J. Medley-Wood, 0/5/1884	Natal Herbarium
9572, L.E.W. Codd, 9/1965	Pretoria Herbarium
9572, L.E.W. Codd, 10/1964	Pretoria Herbarium
2051, J.J. Gerstner, 2/6/1937	Pretoria Herbarium
5824, R.G. Strey, 5/1/1965	Pretoria Herbarium
PRE 37035, A.H. Crundall, 26/6/1959	Pretoria Herbarium
PRE 37037, I.B. Pole-Evans, 10/1953	Pretoria Herbarium
PRE 37039, S. Culverwell, 1/8/1938	Pretoria Herbarium
6628, R.G. Strey, 8/5/1966	Pretoria Herbarium
2951, E.J. Moll, 19/1/1966	Pretoria Herbarium
1989, D.J.B. Killick, 23/5/1953	Pretoria Herbarium
466, D.J.B. Killick, 28/5/1949	Pretoria Herbarium

Records of *Clivia* 'Robust' *gardenii* currently identified as *C. gardenii* or erroneously as *C. nobilis*

Reference/collection number, collector and collection date	Herbarium
NBG 170521, J.P. Rourke (<i>C. gardenii</i>)	Compton Herbarium
NBG 170519, J.P. Rourke (<i>C. gardenii</i>)	Compton Herbarium
517/98, Live collection (<i>C. gardenii</i>)	Kirstenbosch NBG
313/00, Live collection (<i>C. gardenii</i>)	Kirstenbosch NBG
314/00, Live collection (<i>C. gardenii</i>)	Kirstenbosch NBG
319/00, Live collection (<i>C. gardenii</i>)	Kirstenbosch NBG
PRU50750, A. Abbott, 29/4/1984 (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU91172, A Abbott, 5/6/2001 (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU91174, A Abbott, 5/6/2001 (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU91178, A Abbott, 5/6/2001 (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU91168, A Abbott, 5/6/2001 (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU92677, A. Hardinge, (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
PRU92678, A. Hardinge, (<i>C. gardenii</i>)	H.G.W.J. Schweickerdt Herbarium
173/1990, P.J.H. Hurter (<i>C. gardenii</i>)	Lowveld Herbarium
NH 118513.0, E. Cloete, 25/8/1992 (<i>C. nobilis</i>)	Natal Herbarium
NH 29656 .0, F.W. Stewart, 0/6/1938, (<i>C. gardenii</i>)	Natal Herbarium
NH 29668 .0, P.S. Ngcobo, 0/6/1938 (<i>C. gardenii</i>)	Natal Herbarium
NH 80082.0, A.T.D. Abbott, 29/4/1984 (<i>C. gardenii</i>)	Natal Herbarium
NH 115950.0, B. Tarr, 14/8/1992 (<i>C. gardenii</i>)	Natal Herbarium
NH 124782.0, A.T.D. Abbott, 18/5/1995 (<i>C. gardenii</i>)	Natal Herbarium
PRE 37056, W Chiazzari, (<i>C. gardenii</i>)	Pretoria Herbarium
PRE 37058, W Chiazzari (<i>C. gardenii</i>)	Pretoria Herbarium
PRE 37025, Abernethy, 1/1930 (<i>C. gardenii</i>)	Pretoria Herbarium
13407, W. Tyson, 8/1916 (<i>C. nobilis</i>)	Pretoria Herbarium
TM 171 24, W. Tyson, 9/1916 (<i>C. nobilis</i>)	Pretoria Herbarium
UM/1/A, G Frazer, (<i>C. gardenii</i>)	Pretoria Herbarium
1639, A.E. van Wyk, 7/1976 (<i>C. gardenii</i>)	Pretoria Herbarium
885, S. Venter, 7/1976 (<i>C. gardenii</i>)	Pretoria Herbarium
3864, S. Venter, 7/1976 (<i>C. gardenii</i>)	Pretoria Herbarium
124, Vorste Venter, 8/1976 (<i>C. gardenii</i>)	Pretoria Herbarium

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C.E. Moss Herbarium (J), University of the Witwatersrand – R. Reddy
Compton Herbarium (NBG), National Botanical Institute - visited by Z.H. Swanevelder
Herbarium (GLOW), Lowveld National Botanical Garden – J. Hurter
H.G.W.J. Schweickerdt Herbarium (PRU), University of Pretoria – M. Nel and E. van Wyk
Natal Herbarium (NH), National Botanical Institute - H. Aboobaker, PRECIS and printout
National Herbarium (PRE), National Botanical Institute, Pretoria - R. Archer and PRECIS printout
Selmar Schonland Herbarium (GRA), Rhodes University Botany Dept. – T. Dold

APPENDIX II

RFLP DATA MATRIX

Table AII contains all those fragments that were polymorphic after digestion with different restriction enzymes. PCR products and restriction enzymes with no visible polymorphisms are not given here, but in Table 2, Chapter 6.

Table A RFLP data matrix: chloroplast fragments analysed that showed polymorphisms after digestion with various restriction enzymes.

Sample code	PsbA-trn2Kr			rpl2-trnK			rbcL - trnV	Haplotype	Locality ¹
	<i>AluI</i> ² 300 bp insertion (1)	<i>MspI</i> ³ 400 bp (1)	<i>MspI</i> ³ 210 bp (1)	<i>Sau3AI</i> ³ Fragmented 510+300 bp (1)	<i>Tru9I</i> ³ Fragmented 200+150 bp (1)	<i>Tru9I</i> ² 200 bp (1) 150 bp (2)	<i>AluI</i> ² 950 bp (1)		
M6	1	1	1	1	0	0	0	A	BMM
M44	1	1	1	1	0	0	0	A	BMM
M45	1	1	1	1	0	0	0	A	BMM
M46	1	1	1	1	0	0	0	A	BMM
M47	1	1	1	1	0	0	0	A	BMM
M146	1	1	1	0	1	2	0	F	BRO
M147	1	1	1	0	1	2	0	F	BRO
M148	1	1	1	0	1	2	0	F	BRO
M149	1	1	1	0	1	2	0	F	BRO
M150	1	1	1	0	1	2	0	F	BRO
M151	1	1	1	0	1	2	0	F	BRO
M152	1	1	1	0	1	2	0	F	BRO
M153	1	1	1	0	1	2	0	F	BRO
M154	1	1	1	0	1	2	0	F	BRO
M92	1	1	1	1	0	0	0	A	DON
M93	1	1	1	1	0	0	0	A	DON
M94	1	1	1	1	0	0	0	A	DON
M95	1	1	1	1	0	0	0	A	DON
M96	1	1	1	1	0	0	0	A	DON
M97	1	1	1	1	0	0	0	A	DON
M98	1	1	1	1	0	0	0	A	DON
M99	1	1	1	1	0	0	0	A	DON
M100	1	1	1	1	0	0	0	A	DON



Sample code	PsbA-trn2Kr			rpl2-trnK			rbcL-trnV	Haplotype	Locality ¹
	<i>AluI</i> ² 300 bp insertion (1)	<i>MspI</i> ³ 400 bp (1)	<i>MspI</i> ³ 210 bp (1)	<i>Sau3A1</i> ³ Fragmented 510+300 bp (1)	<i>Tru91</i> ³ Fragmented 200+150 bp (1)	<i>Tru91</i> ² 200 bp (1) 150 bp (2)	<i>AluI</i> ² 950 bp (1)		
M35	1	1	1	1	0	0	0	A	KAR
M37	1	1	1	1	0	0	0	A	KAR ⁴
M38	1	1	1	1	0	0	0	A	KAR
M39	1	1	1	1	0	0	0	A	KAR
M40	1	1	1	1	0	0	0	A	KAR
M8	1	1	1	1	0	0	0	A	KAR
M1	1	1	1	1	0	0	0	A	KOE
M2	1	1	1	1	0	0	0	A	KEI
M3	0	0	0	1	1	1	0	B	ORI
M4	1	1	1	1	0	0	0	A	KEN
M5	1	1	1	1	0	0	0	A	KOE
M7	1	1	1	1	0	0	0	A	LEB
M121	1	1	1	1	0	0	0	A	MBA
M122	1	1	1	1	0	0	0	A	MBA
M123	1	1	1	1	0	0	0	A	MBA
M124	1	1	1	1	0	0	0	A	MBA
M125	1	1	1	1	0	0	0	A	MBA
M126	1	1	1	1	0	0	0	A	MBA
M127	1	1	1	1	0	0	0	A	MBA
M128	1	1	1	1	0	0	0	A	MBA
M129	1	1	1	1	0	0	0	A	MBA
M130	1	1	1	1	0	0	0	A	MBA
M131	1	1	1	1	0	0	0	A	MBA
M132	1	1	1	1	0	0	0	A	MBA
M133	1	1	1	1	0	0	0	A	MBA
M134	1	1	1	1	0	0	0	A	MBA
M111	1	1	1	1	0	0	0	A	NQO
M112	1	1	1	1	0	0	0	A	NQO
M113	1	1	1	1	0	0	0	A	NQO
M114	1	1	1	1	0	0	0	A	NQO
M115	1	1	1	1	0	0	0	A	NQO
M116	1	1	1	1	0	0	0	A	NQO
M117	1	1	1	1	0	0	0	A	NQO
M118	1	1	1	1	0	0	0	A	NQO
M119	1	1	1	1	0	0	0	A	NQO
M120	1	1	1	1	0	0	0	A	NQO
M135	1	1	1	1	0	0	0	A	NTO
M136	1	1	1	1	0	0	0	A	NTO
M137	1	1	1	1	0	0	0	A	NTO
M138	1	1	1	1	0	0	0	A	NTO
M139	1	1	1	1	0	0	0	A	NTO



Sample code	PsbA-trn2Kr			rpl2-trnK			rbcL-trnV	Haplotype	Locality ¹
	<i>AluI</i> ² 300 bp insertion (1)	<i>MspI</i> ³ 400 bp (1)	<i>MspI</i> ³ 210 bp (1)	<i>Sau3AI</i> ³ Fragmented 510+300 bp (1)	<i>Tru9I</i> ³ Fragmented 200+150 bp (1)	<i>Tru9I</i> ² 200 bp (1) 150 bp (2)	<i>AluI</i> ² 950 bp (1)		
M140	1	1	1	1	0	0	0	A	NTO
M141	1	1	1	1	0	0	0	A	NTO
M142	1	1	1	1	0	0	0	A	NTO
M143	1	1	1	1	0	0	0	A	NTO
M144	1	1	1	1	0	0	0	A	NTO
M145	1	1	1	1	0	0	0	A	NTO
M14	0	0	0	1	1	1	1	C	MZA
M15	0	0	0	1	1	1	1	C	MZA
M16	0	0	0	1	1	1	1	C	MZA
M17	0	0	0	1	1	1	1	C	MZA
M18	0	0	0	1	1	1	1	C	MZA
M19	0	0	0	1	1	1	1	C	MZA
M20	1	1	1	1	0	0	0	A	PSJ
M21	1	1	1	1	0	0	0	A	PSJ
M22	1	1	1	1	0	0	0	A	PSJ
M23	1	1	1	1	0	0	0	A	PSJ
M24	1	1	1	1	0	0	0	A	PSJ
M25	1	1	1	1	0	0	0	A	PSJ
M26	1	1	1	1	0	0	0	A	PSJ
M27	1	1	1	1	0	0	0	A	PSJ
M28	1	1	1	1	0	0	0	A	PSJ
M29	1	1	1	1	0	0	0	A	PSJ
M30	1	1	1	1	0	0	0	A	PSJ
M31	1	1	1	1	0	0	0	A	PSJ
M32	1	1	1	1	0	0	0	A	PSJ
M34	1	1	1	1	0	0	0	A	PSJ
M36	1	0	1	1	0	0	0	D	PSJ
M41	1	1	1	1	0	0	0	A	PSJ
M42	1	1	1	1	0	0	0	A	PSJ
M43	1	1	1	1	0	0	0	A	PSJ
M48	1	1	1	1	0	0	0	A	PSJ
M49	1	1	1	1	0	0	0	A	PSJ
M50	1	1	1	1	0	0	0	A	PSJ
M51	1	1	1	1	0	0	0	A	PSJ
M52	1	1	1	1	0	0	0	A	PSJ
M53	1	1	1	1	0	0	0	A	PSJ
M54	1	1	1	1	0	0	0	A	PSJ
M55	1	1	1	1	0	0	0	A	PSJ
M56	1	1	1	1	0	0	0	A	PSJ
M57	1	1	1	1	0	0	0	A	PSJ
M58	1	1	1	1	0	0	0	A	PSJ



Sample code	PsbA-trn2Kr			rpl2-trnK			rbcL-trnV	Haplotype	Locality ¹
	<i>AluI</i> ² 300 bp insertion (1)	<i>MspI</i> ³ 400 bp (1)	<i>MspI</i> ³ 210 bp (1)	<i>Sau3AI</i> ³ Fragmented 510+300 bp (1)	<i>Tru9I</i> ³ Fragmented 200+150 bp (1)	<i>Tru9I</i> ² 200 bp (1) 150 bp (2)	<i>AluI</i> ² 950 bp (1)		
M59	1	1	1	1	0	0	0	A	PSJ
M60	1	1	1	1	0	0	0	A	PSJ
M101	1	1	1	1	0	0	0	A	QOR
M102	1	1	1	1	0	0	0	A	QOR
M103	1	1	1	1	0	0	0	A	QOR
M104	1	1	1	1	0	0	0	A	QOR
M105	1	1	1	1	0	0	0	A	QOR
M106	1	1	1	1	0	0	0	A	QOR
M107	1	1	1	1	0	0	0	A	QOR
M108	1	1	1	1	0	0	0	A	QOR
M109	1	1	1	1	0	0	0	A	QOR
M110	1	1	1	1	0	0	0	A	QOR
M61	1	1	1	1	0	0	0	A	NGO
M62	1	1	1	1	0	0	0	A	NGO
M63	1	1	1	1	0	0	0	A	NGO
M64	1	1	1	1	0	0	0	A	NGO
M65	1	1	1	1	0	0	0	A	NGO
M66	1	1	1	1	0	0	0	A	NGO
M67	1	1	1	1	0	0	0	A	NGO
M68	1	1	1	1	0	0	0	A	NGO
M69	1	1	1	1	0	0	0	A	NGO
M70	1	1	1	1	0	0	0	A	NGO
M71	1	1	1	1	0	0	0	A	UMT
M72	1	1	1	1	0	0	0	A	UMT
M73	0	0	0	1	1	1	1	C	UMT
M74	0	0	0	1	1	1	1	C	UMT
M75	0	0	0	1	1	1	1	C	UMT
M76	1	1	1	1	0	0	0	A	UMT
M77	1	1	1	1	0	0	0	A	UMT
M78	0	0	0	1	1	1	1	C	UMT
M79	1	1	1	1	1	1	0	E	UMT
M80	0	0	0	1	1	1	1	C	UMT
M81	1	1	1	1	0	0	0	A	UMT
M82	0	0	0	1	1	1	1	C	UMT
M83	1	1	1	1	0	0	0	A	UMT
M84	0	0	0	1	1	1	1	C	UMT
M85	1	1	1	1	0	0	0	A	UMT
M86	1	1	1	1	0	0	0	A	UMT
M87	0	0	0	1	1	1	1	C	UMT
M88	0	0	0	1	1	1	1	C	UMT
M89	0	0	0	1	1	1	1	C	UMT



Sample code	PsbA-trn2Kr			rpl2-trnK			rbcL-trnV	Haplotype	Locality ¹
	<i>AluI</i> ² 300 bp insertion (1)	<i>MspI</i> ³ 400 bp (1)	<i>MspI</i> ³ 210 bp (1)	<i>Sau3AI</i> ³ Fragmented 510+300 bp (1)	<i>Tru9I</i> ³ Fragmented 200+150 bp (1)	<i>Tru9I</i> ² 200 bp (1) 150 bp (2)	<i>AluI</i> ² 950 bp (1)		
M90	0	0	0	1	1	1	1	C	UMT
M91	1	1	1	1	0	0	0	A	UMT
M9	0	0	0	1	1	1	1	C	UMT
M10	0	0	0	1	1	1	1	C	UMT
M11	0	0	0	1	1	1	1	C	UMT
M12	0	0	0	1	1	1	1	C	UMT
M13	0	0	0	1	1	1	1	C	UMT

¹ Locality abbreviations: BMM–Bearded Man Mountain, BRO–Broedershoek Farm, DON–Donkeni, HOW–Howick Falls, KAR–Karkloof, KEI–Kei River Mouth, KOE–Koek-Koek River, KEN–Kentani Area, LEB–Lebombo Mountains, MBA–Mbashe River, NQO–Nqobara River, NTO–Ntomeni Forest, MZA–Mzamba River, ORI–Oribi Gorge, PSJ–Port St Johns, QOR–Qora, NGO–Ngoye Forest, UMT–Umtamvuna Nature Reserve.

² Insertion/deletion mutation.

³ Point mutation.

⁴ Sample from Howick falls near Karkloof.

APPENDIX III

MICROSATELLITE SEQUENCE DATA

1) Sequences used for the development of microsatellites markers

Microsatellite CLV1 isolated with primer DBV(CAT)₅

NNCCACGTCCCATGCTCCCGGCCCATGGCGGCCGCGGGAATTCGATTGGG
 CATCATCTTCATCATCATCATCATNTTCTTCTTCTTCTTCGATTTACTATTCTA
 ATGAGTTTTTTCGCTCGAATTACGATCGAATGGTGAAGGATTTCAAGGCTTTC
 ATTTACCCAGATGGGGATCCGAATACTTATTACCAGACGCCGAGGAAATTGA
 CGGGGAAGTACTCGAGCGAGGGCTACTTCTCCAGAACATTCGAGAAAGCGG
 GTTCCGACCCAGGATCCGGATCAGGCCGATCTCTTTTTTGTACCGATATCGT
 GCCATAAGATGAGAGGAAAGGTGAGATTTTGTGGGTTCTGTCTGTTGATATT
 TGATCCGATGGTAATAATGTGAATTTACTCATTACTATAAGAATGTGCGTAT
 ACTGAAAGCTGTTTGTCTATAAAATGATGTGTAGATCTAAATGTTATTGTTCA
 TTTACAATAATGTGGCTAATGGGTTGTTTAAGTAGCATATTAGTCAGATAAAA
 GCCTTGAAATGTGATTTTTTATGTTTGGTTGAATACTTTCTGTTGATATTGG
ATTTTATTTTTTGAAATTTGAATCACTAGTGAATTCGCCGGCCGCCTGCAGG
 TCGACCATATGGGAGAGCTCCCAACGCGTTGGATGCATAGCTTGAGTATTCT
 ATAGTGTCCCCCCCCAAAA

Primers are indicated by arrows and microsatellite by the box.

Microsatellite CLV4 isolated with primer DBV(CAT)₅

CCTTTAAGCCTTTCNACGTCCCATGCTCCCGGCCCATGGCGGCCGCGGGAA
 TTCGATTGGCCATCATCATCATCATCATCCTTNATCTTCACGAGACATGC
 ATCCCTTGCTCCTCTACTCCTTCCAACCCCCCATAGGCAGCAATCCTCGAGTC
 CCCTACTTCAGCCTCCTTCTCCTCCTCGCTTTTTAATGTATATTACCTTCTC
 TTTGTTCCCTTACTCAGGACTCATCAATCACTAGTGAATTCGCGGCCGCCTGCA
 GGTCGACCATATGGGAGAGCTCCCAACGCGTTGGATGCATAGCTTGAGTATTC
 TATAGTGTACCTAAATAANCNCCC



Primers are indicated by arrows and microsatellite by the box.

Microsatellites CLV2 and CLV3 isolated with primer HBD(GACA)₄

CTAAGTCCCTTTNCCNACGNCCCATGCTCCNTGCCGCCATGGCGGCCGCGGGA
 ATTCGATTCTTGGACAGACAGACAGACAGAGANATGTNGATCGCGATGGGACC
 TGCTAATATAGTTTAAATTTTGTGTTTTTGCAAAAACTTGTGTAGCTTGTAATAG
 CTAGAATAATTAGTGGTGTGTGTGTGTGTGCGTATGCCCTCTGGCTCC
 CTCCACAATGGAAGCTACGAGGTCAGTCGTTTTTGCCTTTCTTTCTGTTTCTAT
 TTTTGTCTGTGTGTGAGAAAGGTCCAAAATGACAGCTTAGCTGTCGTTCTTAN
 ACTCTCTCTTGATGAGAACGACAACTCCTCTGCCGTTCAGAGAAAATTTCTTT
 TTTTCAAGAAAATTCTCTGAGCGACAGGTTGCCTGCCGCTCAGAGAGCTTTCTT
 AGACAAAGCAACACCCTGCATGCCGCTCTAAAGATTTGAGCTCTTGCACCAA
 AACTCTCATTTTAAAAAAAAAAAATGCTCTTTGTTAGGCGCTCTTACGNCCT
 ATATNCTACATCTGGAAGATACACCTCCACCTTGCCTAGTGCCTGCACCCAT
 ATGGACATACNCTTAATCATTGTCNCCNCCATCTCATAGATCTAGGAAACCAAT
 CCTTTATTAATAATTGGCGCTTGGGGGGTCTGCTTATCAGTTAACCCACCTCC
 GAGTTCGGGTAAATAATACCCTAAAGCGGNGGNCG

Primers are indicated by arrows and microsatellites by the boxes.

Microsatellites identified, but no primers designed

Sequence produced by primer DHB(CGA)₅

CGACGACGACGATTGGGATCTCAATGACGACAACGACGACGAAAATTGGGA
 TCTTGATGACGACAATTCGAAAACCCAAGAAAATTTGGAGGATGATGAGGT
 GGACAAAGAGCCGCGAGCGGGCCTTACCACCTCGCAGCGCCCGAGGCCGTCG
 ATTTGTGATAAACGAAGATAGTGATTTTGAACAATTCATTTGGGATCGAA
 GAAGAGGACGATGATGAAGAAGAGGAATTTGGGATTGAAGAGAATAAGGGG
 AATGGTAATGGGGGATATGAGATTGATGTTGTTGGGAAGGCGTTGAGGAAAT
 GTGCAAAGATATCAGCAGAGTTGAGGAAGGAGCTATATGGGTCCGCTACGGT
 TTTGGAAGATAGGTACGCTGAAGTGGAGGTCTCGTCGTCTCGTCGTCTCGAA
 A

AATCACTAGTGAATTCGCGGCCCGCCTGCAGGTCGACCATATGGGAGAGCTCC
CAACGCGTTGGATGCATAGCTTGAGTATTCTATAGTGTCACCCT

The box indicates a microsatellite.

Sequence produced by primer HBD(GACA)₄

CTAAGTCCCTTTNCCNACGNCCCATGCTCCNTGCCGCCATGGCGGCCGCGGG
AATTCGATTCTTGGACAGACAGACAGAGANATGTNGATCGCGATGGGA
CCTGCTAATATAGTTTAAATTTTTGTTTTTGCAAAACTTGTTGTAGCTTGTA
ATAGCTAGAATAATTTAGTGGTGTGTGTGTGTGTGTGCGTATGCCCTCTGGCT
CCCTCCACAATGGAAGCTACGAGGTCAGTCGTTTTTGCTTTTCTTTCTGTTT
CCTATTTTTGTTCTGTGTGTGAGAAAGGTCCAAAATGACAGCTTAGCTGTTCGT
TCTTANACTCTCTCTTGATGAGAACGACAACCTCTGCCGTTTCAGAGAACAA
ATTCTTTTTTCAGGAAAAATTCTCTGAGCGACAGGTTGCCTGCCGCTCAGAGA
GCTTTCTTAGACAAAGCAACACCCTGCATGCCGCTCTAAAGATTTGAGCTCTT
TGCACCAAACTCTCATTTCAAAAAAAAAATTGCTCTTTGTTAGGCGCTCT
TTACGNCCTATATNCTACATCTGGAAGATACACCTCCACCTTGCACTAGTGCA
CTGCACCCATATGGACATAACNCTTAATCATTTGCNCCNCCATCTCATAGATCT
AGGAAACCAATCCTTTATTAATAAATTGGCGCTTGGGGGGTTCTGCTTATCAGTT
AACCCACCTCCGAGTTCGGGTAAAAATACCCTAAAGCGGNGGNCG

The boxes indicate Microsatellites.

Sequence produced by primer DBD(CAC)₅

TTNCGTTTGTTCCCNNTTCGCATGCTCCCGGCCCGCCTGGNNGNNCACNATATGG
GANNGGTGCCNCGCGTNGGNTGCCTNNCTATGAGTATTCTATAGNGTCACC
TNAATATCCCAAGCTTGCTTCAACTCAGGCAACCTAAATGACCTCTGCACCTG
GAAAATGAACTCCTGAATCCTCACACCTAGTTGTGTACCCCTTTCTAGCAAC
ATGGAATGTAGACACAGTTGTACATAACAAGCTTGTTCATGGCCAGGGGAACAT
GTACTCAGTGCCAGAGTCTGAAATTGAACCCCATATGATAAAGAATCCAAT
CTGAGCAAAAAACACCCCAACCTCCAAGCGAATCCCAAACCCCAATAAA



GCATGTAACCTCCTATTTAGAATTTAGGAATGAGCTTGCAGCCATTTGCCTGCC
TTCTCATTTGTTCTCAACATTTTCATTGCCAAAAGGTAATTGATAACTTTTCTA
ATAATAAAATCCTAAAGCAAACCCACAAAATTCATAGAAGAATTTGCTCAAA
CACTATCTAGGCAACTCATTTATTTATCAAATTATTCCCAAAAAACACCN
ATTGGGTTTCTTCTACATAATCAAACAAACCCATCAAGTCTCTCATAGAAAT
NACTCAAGCCTAATAAACCAACTCATTTCTTCATCAAATTAGACAACAATTT
TTACTCAAGAACTAATAAACCATCTCATTTTCNAATACATACCTTT

The box indicates a microsatellite.

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