

Appendix 1. Character states, as defined by Harrison & Philips (2003), of the taxa used in the morphological and combined Parsimony analysis. 0 primitive; 1-5 derived (in sequence); ? unknown character state; - not applicable character state.

| TAXA | Characters | | | | | | |
|------------------------------------|-------------|------------|------------|------------|------------|------------|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| | 01234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 123 |
| <i>S. (Pachysoma) rodriguessi</i> | 01301100233 | 1022211230 | 3102401511 | 2003230111 | 0323141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) rotundigenus</i> | 01301100233 | 1022211030 | 2102301011 | 0003230111 | 1313141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) denticollis</i> | 01301100233 | 1022212230 | 3102301011 | 2003230111 | 0323141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) bennigseni</i> | 01301100233 | 0011012032 | 0102300011 | 2003230111 | 0223141111 | 1131120211 | 111 |
| <i>S. (Pachysoma) gariepinus</i> | 02301100333 | 0001212031 | 0002300011 | 1013230011 | 0323141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) striatus</i> | 0130-211333 | 0002210030 | 0002300001 | 1013230011 | 0323141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) fitzsimonsi</i> | 02301100313 | 0001012032 | 0002301001 | 1103230011 | 0223141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) schinzi</i> | 01321000111 | 0101020032 | 0002301001 | 0003230211 | 0223141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) valeflorae</i> | 01331000111 | 0101021332 | 0102301001 | 0003230211 | 0113141111 | 1131121211 | 110 |
| <i>S. (Pachysoma) hippocrates</i> | 0131-211311 | 0122010130 | 0102400101 | 0203230211 | 0113141111 | 1131121211 | 111 |
| <i>S. (Pachysoma) endroedyi</i> | 0031-211311 | 0021010032 | 0002300111 | 0213230211 | 0103141111 | 1131121211 | 111 |

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|---|--|
| <i>S. (Pachysoma) glentoni</i> | 0131-211311 0022010130 0002301101 0203230211 0113141111 1131121211 111 |
| <i>S. (Pachysoma) aesculapius</i> | 0131-211311 0100010032 0002301101 0203230211 0223141111 1131121211 111 |
| <i>S. (Scarabaeolus) rubripennis</i> | 00000001011 1011110111 2002100200 2001001000 1000020000 0010010000 000 |
| <i>S. [Neatechus] proboscideus</i> | 32001001010 1010221120 2002100210 0002012011 1322120000 0000001000 010 |
| <i>Scarabaeus rugosus</i> | 11001001011 1110210010 0002200200 0001002111 1302120000 0010010000 000 |
| <i>Scarabaeus galenus</i> | 42001101010 2102210110 2002100200 0102012111 0101130000 0010011000 010 |
| <i>Scarabaeus westwoodi</i> | 40010001111 1110210310 0002100000 0001001001 0102120000 0010011000 000 |
| <i>Scarabaeus rusticus</i> | 11000001111 111?210110 0002200300 0001000101 0100120000 0010010000 000 |
| <i>Sceliages brittoni</i> | 0000-211011 1110100101 0000300010 0001201201 0110000000 0000010000 000 |
| <i>Scarabaeus (Drepanopodus) proximus</i> | 10000001111 0011210230 2012214320 2001002100 0002130000 0020111000 000 |

Appendix 2. Summary of 140 individuals of three species of *S. (P.) Pachysoma* characterised in Chapter 4

| Species | Specimen ID | Locality | Co-ordinates | GenBank Accession No. |
|----------------------------|-------------|----------------------|-----------------------------|-----------------------|
| <i>S. (P.) hippocrates</i> | BVPH01 | Brakvlei - Koekenaap | S31°25'27.3" - E18°01'38.1" | AY965154 |
| | BVPH02 | Brakvlei - Koekenaap | S31°25'27.3" - E18°01'38.1" | AY965155 |
| | BVPH03 | Brakvlei - Koekenaap | S31°25'27.3" - E18°01'38.1" | AY965156 |
| | BVPH04 | Brakvlei - Koekenaap | S31°25'27.3" - E18°01'38.1" | AY965157 |
| | KKPH01 | Kommandokraal Farm | S31°29'58.4" - E18°12'29.2" | AY965158 |
| | KKPH02 | Kommandokraal Farm | S31°29'58.4" - E18°12'29.2" | AY965159 |
| | KKPH03 | Kommandokraal Farm | S31°29'58.4" - E18°12'29.2" | AY965160 |
| | KKPH04 | Kommandokraal Farm | S31°29'58.4" - E18°12'29.2" | AY965161 |
| | KKPH05 | Kommandokraal Farm | S31°29'58.4" - E18°12'29.2" | AY965162 |
| | LAPH01 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965163 |
| | LAPH02 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965164 |
| | LAPH03 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965165 |
| | LAPH04 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965166 |
| | LAPH05 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965167 |
| | LAPH06 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965168 |
| | LAPH07 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965169 |
| | LAPH08 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965170 |
| | LAPH09 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965171 |
| | LAPH10 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965172 |
| | LAPH11 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965173 |
| | LAPH12 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965174 |
| | LAPH13 | 10km W Leipoldtville | S32°13'06.3" - E18°26'06.8" | AY965175 |
| | PNPH01 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965176 |
| | PNPH02 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965177 |
| | PNPH03 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965178 |
| | PNPH04 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965179 |
| | PNPH05 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965180 |
| | PNPH06 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965181 |

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|---------------------------|--------|--------------------|-----------------------------|----------|
| | PNPH07 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965182 |
| | PNPH08 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965183 |
| | PNPH09 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965184 |
| | PNPH10 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965185 |
| | PNPH01 | Port Nolloth | S29°14'12.9" - E16°52'01" | AY965186 |
| | SKPH01 | Sandkop | S29°40'03" - E17°12'13.2" | AY965187 |
| | SKPH02 | Sandkop | S29°40'03" - E17°12'13.2" | AY965188 |
| | SKPH03 | Sandkop | S29°40'03" - E17°12'13.2" | AY965189 |
| | SKPH04 | Sandkop | S29°40'03" - E17°12'13.2" | AY965190 |
| | SKPH05 | Sandkop | S29°40'03" - E17°12'13.2" | AY965191 |
| | SKPH06 | Sandkop | S29°40'03" - E17°12'13.2" | AY965192 |
| | SKPH08 | Sandkop | S29°40'03" - E17°12'13.2" | AY965193 |
| | SKPH09 | Sandkop | S29°40'03" - E17°12'13.2" | AY965194 |
| | SKPH10 | Sandkop | S29°40'03" - E17°12'13.2" | AY965195 |
| | SKPH11 | Sandkop | S29°40'03" - E17°12'13.2" | AY965196 |
| | SKPH12 | Sandkop | S29°40'03" - E17°12'13.2" | AY965197 |
| | SKPH13 | Sandkop | S29°40'03" - E17°12'13.2" | AY965198 |
| | SKPH14 | Sandkop | S29°40'03" - E17°12'13.2" | AY965199 |
| | SKPH15 | Sandkop | S29°40'03" - E17°12'13.2" | AY965200 |
| | SKPH16 | Sandkop | S29°40'03" - E17°12'13.2" | AY965201 |
| | SKPH17 | Sandkop | S29°40'03" - E17°12'13.2" | AY965202 |
| | SKPH18 | Sandkop | S29°40'03" - E17°12'13.2" | AY965203 |
| | SKPH19 | Sandkop | S29°40'03" - E17°12'13.2" | AY965204 |
| | SKPH20 | Sandkop | S29°40'03" - E17°12'13.2" | AY965205 |
| | SKPH24 | Sandkop | S29°40'03" - E17°12'13.2" | AY965206 |
| <i>S. (P.) gariepinus</i> | LKPG01 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965087 |
| | LKPG02 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965088 |
| | LKPG03 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965089 |
| | LKPG04 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965090 |
| | LKPG05 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965091 |
| | LKPG06 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965092 |
| | LKPG07 | Langhoogte/Kommgas | S29°34'03.5" - E17°24'19.7" | AY965093 |

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|--------|--------------------|-----------------------------|----------|
| LKPG08 | Langhoogte/Kommgas | S29°34'03.5" - E17°24"19.7" | AY965094 |
| LKPG09 | Langhoogte/Kommgas | S29°34'03.5" - E17°24"19.7" | AY965095 |
| LKPG10 | Langhoogte/Kommgas | S29°34'03.5" - E17°24"19.7" | AY965096 |
| LKPG11 | Langhoogte/Kommgas | S29°34'03.5" - E17°24"19.7" | AY965097 |
| LKPG12 | Langhoogte/Kommgas | S29°34'03.5" - E17°24"19.7" | AY965098 |
| HRPG01 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965113 |
| HRPG02 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965114 |
| HRPG03 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965115 |
| HRPG04 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965116 |
| HRPG05 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965117 |
| HRPG06 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965118 |
| HRPG07 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965119 |
| HRPG08 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965120 |
| HRPG09 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965121 |
| HRPG10 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965122 |
| HRPG11 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965123 |
| HRPG12 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965124 |
| HRPG13 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965125 |
| HRPG14 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965126 |
| HRPG15 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965127 |
| HRPG16 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965128 |
| HRPG17 | Holgat River | S28°56'15.2" - E16°46"55.4" | AY965129 |
| HFPG01 | Hohenfels | S28°30'29" - E16°36"58" | AY965130 |
| HFPG02 | Hohenfels | S28°30'29" - E16°36"58" | AY965131 |
| HFPG03 | Hohenfels | S28°30'29" - E16°36"58" | AY965132 |
| HFPG04 | Hohenfels | S28°30'29" - E16°36"58" | AY965133 |
| HFPG05 | Hohenfels | S28°30'29" - E16°36"58" | AY965134 |
| HFPG06 | Hohenfels | S28°30'29" - E16°36"58" | AY965135 |
| HFPG07 | Hohenfels | S28°30'29" - E16°36"58" | AY965136 |
| HFPG08 | Hohenfels | S28°30'29" - E16°36"58" | AY965137 |
| HFPG09 | Hohenfels | S28°30'29" - E16°36"58" | AY965138 |
| HFPG10 | Hohenfels | S28°30'29" - E16°36"58" | AY965139 |

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|---------------------|--------|------------------------|-----------------------------|----------|
| | HFGP11 | Hohenfels | S28°30'29" - E16°36'58" | AY965140 |
| | HFGP12 | Hohenfels | S28°30'29" - E16°36'58" | AY965141 |
| | HFGP13 | Hohenfels | S28°30'29" - E16°36'58" | AY965142 |
| | DOPG01 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965143 |
| | DOPG02 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965144 |
| | DOPG03 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965145 |
| | DOPG04 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965146 |
| | DOPG05 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965147 |
| | DOPG06 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965148 |
| | DOPG07 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965149 |
| | DOPG08 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965150 |
| | DOPG09 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965151 |
| | DOPG10 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965152 |
| | DOPG11 | Daberas to Obib Dunes | S28°08'44" - E16°44'45" | AY965153 |
| | KHPG01 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965099 |
| | KHPG02 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965100 |
| | KHPG03 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965101 |
| | KHPG04 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965102 |
| | KHPG05 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965103 |
| | KHPG06 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965104 |
| | KHPG07 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965105 |
| | KHPG08 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965106 |
| | KHPG09 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965107 |
| | KHPG10 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965108 |
| | KHPG11 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965109 |
| | KHPG12 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965110 |
| | KHPG13 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965111 |
| | KHPG14 | Klingharts Mountains | S27°24'18" - E15°37'26" | AY965112 |
| S. (P.) denticollis | LAPD11 | Luderitz - Agate Beach | S26°41'17.1" - E15°15'50.1" | AY258254 |
| | LTPD12 | Luderitz - Agate Beach | S26°41'17.1" - E15°15'50.1" | AY258253 |
| | KPPD01 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965218 |
| | KPPD02 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965219 |

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|--------|-------------|-----------------------------|----------|
| KPPD03 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965220 |
| KPPD04 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965221 |
| KPPD05 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965222 |
| KPPD06 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965223 |
| KPPD07 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965224 |
| KPPD08 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965225 |
| KPPD09 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965226 |
| KPPD10 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965227 |
| KPPD11 | Koichab Pan | S26°13'02.4" - E15°57'52.9" | AY965228 |
| NRPD01 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965229 |
| NRPD02 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965230 |
| NRPD04 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965231 |
| NRPD05 | Namib Rand | S25°12'52.5" - E16°01'10" | AY258255 |
| NRPD06 | Namib Rand | S25°12'52.5" - E16°01'10" | AY258256 |
| NRPD07 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965233 |
| NRPD09 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965234 |
| NRPD15 | Namib Rand | S25°12'52.5" - E16°01'10" | AY965237 |
