**Appendix 8:** Results of the different models: a) for the single best tree under DEC+J; b) for the single best tree under DEC; and c) for bootstrap trees under DEC+J. deltaAIC values are calculated overall across models for a given tree, and separately for the max areas/adjacency matrix, the biogeographic scenarios, and the distance models (“per comparison”). Models within deltaAIC=2 of the best score overall are bold underlined.

**a) Single best tree, DEC+J model.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -69.98 | 0.0007 | 1E-12 | 0.0007 | 146 | 15 | 12.8 |
| Max area=2 |  | -69.9 | 0.0008 | 1E-12 | 0.0007 | 145.8 | 14.8 | 12.6 |
| Adjacency matrix |  | -63.61 | 0.0027 | 1E-12 | 0.0006 | 133.2 | 2.2 | 0 |
| Max area=2 + adjacency matrix |  | -63.6 | 0.0027 | 1E-12 | 0.0006 | 133.2 | 2.2 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | |  |
| **Stepping Stone (w=1)** | 0 | -96.18 | 0.008 | 1E-12 | 0.024 | 198.4 | 67.4 | 67.4 |
|  | 1 | -70.64 | 0.0054 | 1E-12 | 0.028 | 147.3 | 16.3 | 16.3 |
|  | 5 | -65.9 | 0.0059 | 1E-12 | 0.013 | 137.8 | 6.8 | 6.8 |
|  | 7.5 | -65.06 | 0.0061 | 1E-12 | 0.0085 | 136.1 | 5.1 | 5.1 |
|  | 10 | -64.52 | 0.0061 | 1E-12 | 0.0064 | 135 | 4 | 4 |
|  | **25** | **-63.34** | **0.0052** | **1E-12** | **0.0026** | **132.7** | **1.7** | **1.7** |
|  | **50** | **-63.14** | **0.004** | **1E-12** | **0.0013** | **132.3** | **1.3** | **1.3** |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -83.07 | 0.0045 | 0.0006 | 0.0056 | 172.1 | 41.1 | 41.1 |
|  | 1 | -71.75 | 0.0035 | 1E-12 | 0.0032 | 149.5 | 18.5 | 18.5 |
|  | 5 | -67.49 | 0.0035 | 1E-12 | 0.0027 | 141 | 10 | 10 |
|  | 7.5 | -66.53 | 0.0035 | 1E-12 | 0.0025 | 139.1 | 8.1 | 8.1 |
|  | 10 | -65.89 | 0.0035 | 1E-12 | 0.0023 | 137.8 | 6.8 | 6.8 |
|  | 25 | -64.28 | 0.0034 | 1E-12 | 0.0017 | 134.6 | 3.6 | 3.6 |
|  | 50 | -63.63 | 0.0031 | 1E-12 | 0.0011 | 133.3 | 2.3 | 2.3 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -72.09 | 0.0033 | 0.0006 | 0.0037 | 150.2 | 19.2 | 19.2 |
|  | 1 | -64.09 | 0.0027 | 1E-12 | 0.0033 | 134.2 | 3.2 | 3.2 |
|  | **5** | **-62.52** | **0.0027** | **1E-12** | **0.0024** | **131** | **0** | **0** |
|  | **7.5** | **-62.62** | **0.0027** | **1E-12** | **0.0026** | **131.2** | **0.2** | **0.2** |
|  | **10** | **-62.52** | **0.0027** | **1E-12** | **0.0024** | **131** | **0** | **0** |
|  | **25** | **-62.51** | **0.0028** | **1E-12** | **0.0017** | **131** | **0** | **0** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(*E. aborea* European)** | 25 | **-61.92** | **0.0024** | **1E-12** | **0.0021** | **129.8** | **x** | **x** |
| **w =0.8** | **25** | **-62.61** | **0.0028** | **1E-12** | **0.0015** | **131.23** | **0.23** | **0.23** |
| **w =0.5** | **25** | **-62.88** | **0.0028** | **1E-12** | **0.0011** | **131.76** | **0.76** | **0.76** |
| **w =0.1** | **25** | **-63.43** | **0.0027** | **1E-12** | **0.00071** | **132.86** | **1.86** | **1.86** |
|  | **50** | **-62.88** | **0.0028** | **1E-12** | **0.0011** | **131.8** | **0.8** | **0.8** |
|  |  |  |  |  |  |  |  |  |
| **Geographic distance** | **As disp. probability (0 to 1)** | **-62.79** | **0.0029** | **1E-12** | **0.0012** | **131.58** | **0.58** | **0** |
|  | As distance (1 to x) | -72.37 | 0.0002 | 1E-12 | 0.00001 | 150.7 | 19.7 | 19.12 |
|  | As distance ^ -0.25 | -64.16 | 0.0034 | 1E-12 | 0.0013 | 134.3 | 3.3 | 2.72 |
|  | As distance ^ -1 | -71.40 | 0.004 | 1E-12 | 0.0032 | 148.8 | 17.8 | 17.22 |
|  | As distance ^ -2 | -83.18 | 0.0035 | 1E-12 | 0.0029 | 172.4 | 41.4 | 40.82 |
| Niche similarity | Schoener‘s D | -64.22 | 0.0047 | 1E-12 | 0.0013 | 134.4 | 3.4 | 2.82 |
| Niche plus distance as multipl. | As disp. probability/distance matrix | -64.01 | 0.0049 | 1E-12 | 0.0020 | 134.0 | 3.0 | 2.4 |

**b) Single best tree, DEC model.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Model | Dispersal multiplier | LnL | d [1/Ma] | e [1/Ma] | AIC | deltaAIC | deltaAIC per comparison |
| no constraint |  | -73.59 | 0.0011 | 1E-12 | 151.2 | 10 | 0.24 |
| Max area=2 |  | -73.48 | 0.0011 | 1E-12 | 150.96 | 9.76 | 0 |
| Adjacency matric |  | -76.72 | 0.0038 | 1E-12 | 157.44 | 16.24 | 6.48 |
| Max area=2 + adjacency matrix |  | -76.7 | 0.0039 | 1E-12 | 157.4 | 16.2 | 6.44 |
|  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | |  |
| Stepping Stone (w=1) | 0 | -79.41 | 0.011 | 1E-12 | 162.8 | 21.6 | 21.6 |
|  | 1 | -76.63 | 0.01 | 1E-12 | 157.3 | 16.1 | 16.1 |
|  | 5 | -72.12 | 0.0076 | 1E-12 | 148.2 | 7 | 7 |
|  | 7.5 | -71.47 | 0.0066 | 1E-12 | 146.9 | 5.7 | 5.7 |
|  | 10 | -71.18 | 0.0058 | 1E-12 | 146.4 | 5.2 | 5.2 |
|  | 25 | -71.21 | 0.0034 | 1E-12 | 146.4 | 5.2 | 5.2 |
|  | 50 | -72.09 | 0.002 | 1E-12 | 148.2 | 7 | 7 |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Cape to Cairo (w=1) | 0 | -89.65 | 0.0062 | 0.0005 | 183.3 | 42.1 | 42.1 |
|  | 1 | -76.7 | 0.0044 | 1E-12 | 157.4 | 16.2 | 16.2 |
|  | 5 | -73.14 | 0.0039 | 1E-12 | 150.3 | 9.1 | 9.1 |
|  | 7.5 | -72.43 | 0.0036 | 1E-12 | 148.9 | 7.7 | 7.7 |
|  | 10 | -72.03 | 0.0034 | 1E-12 | 148.1 | 6.9 | 6.9 |
|  | 25 | -71.52 | 0.0025 | 1E-12 | 147 | 5.8 | 5.8 |
|  | 50 | -72.09 | 0.0018 | 1E-12 | 148.2 | 7 | 7 |
|  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -77.02 | 0.004 | 0.0007 | 158 | 16.8 | 16.8 |
|  | 1 | -69.66 | 0.0035 | 1E-12 | 143.32 | 2.12 | 2.12 |
|  | **5** | **-68.66** | **0.0029** | **1E-12** | **141.3** | **0.1** | **0.1** |
|  | **7.5** | **-68.61** | **0.003** | **1E-12** | **141.2** | **0** | **0** |
| **(*E. aborea* not widespread)** | **7.5** | -68.54 | 0.003 | 1.00E-12 | 141.1 | x | x |
| **w =0.8** | **7.5** | **-68.77** | **0.0028** | **1E-12** | **141.5** | **0.3** | **0.3** |
| w =0.5 | 7.5 | -69.67 | 0.0022 | 1E-12 | 143.3 | 2.1 | 2.1 |
| w =0.1 | 7.5 | -72.48 | 0.0013 | 1E-12 | 149 | 7.8 | 7.8 |
|  | **10** | **-68.66** | **0.0029** | **1E-12** | **141.3** | **0.1** | **0.1** |
|  | **25** | **-69.52** | **0.0023** | **1E-12** | **143** | **1.8** | **1.8** |
|  | 50 | -72.09 | 0.0018 | 1E-12 | 148.2 | 7 | 7 |
|  |  |  |  |  |  |  |  |
| Geographic distance | As disp multiplier (0 to 1) | -69.68 | 0.0021 | 1E-12 | 143.4 | 2.2 | 0 |
|  | As Distance ( to x) | -90.3 | 0.000018 | 1E-12 | 184.6 | 43.4 | 41.2 |
| (Divalike \* J was better) | As distance ^ -0.25 | -71.38 | 0.0023 | 1E-12 | 146.8 | 5.6 | 3.4 |
|  | As distance ^ -1 | -74.66 | 0.0054 | 1E-12 | 153.3 | 12.1 | 9.9 |
|  | As distance ^ -2 | -85.62 | 0.0052 | 1E-12 | 175.2 | 34 | 31.8 |
| Niche similarity | Schoener‘s D | -72.84 | 0.0024 | 1E-12 | 149.67 | 8.47 | 6.27 |
| Niche plus distance as multipl. | As disp. probability/distance matrix | -70.42 | 0.0038 | 1E-12 | 144.8 | 3.6 | 1.4 |

**c) Bootstrap trees, DEC+J model.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BS-tree** | Dispersal multiplier | Biogeographic model | LnL | AIC | deltaAIC | deltaAIC per comp. |
| **1\_1** |  | No constraint | -69.53 | 145.1 | 15.7 | 10.2 |
|  |  | Max area=2 + adjacency matrix | -64.43 | 134.9 | 5.5 | 0 |
|  | 0 | Drakensberg melting pot | -69.39 | 144.8 | 15.4 | 13.3 |
|  |  | Cape to Cairo | -73.68 | 153.4 | 24 | 21.9 |
|  |  | Stepping stone | -94.05 | 194.1 | 64.7 | 62.6 |
|  | 0.01 | Drakensberg melting pot | -65.69 | 137.4 | 8 | 5.9 |
|  |  | Cape to Cairo | -68.86 | 143.7 | 14.3 | 12.2 |
|  |  | Stepping stone | -75.05 | 156.1 | 26.7 | 24.6 |
|  | 0.1 | Drakensberg melting pot | -64.05 | 134.1 | 4.7 | 2.6 |
|  |  | Cape to Cairo | -63.51 | 133 | 3.6 | **1.5** |
|  |  | Stepping stone | -68.7 | 143.4 | 14 | 11.9 |
|  | 0.25 | Drakensberg melting pot | -63.89 | 133.8 | 4.4 | 2.3 |
|  |  | Cape to Cairo | -62.74 | 131.5 | 2.1 | **0** |
|  |  | Stepping stone | -67.03 | 140.1 | 10.7 | 8.6 |
|  | 0.5 | Drakensberg melting pot | -64.04 | 134.1 | 4.7 | 2.6 |
|  |  | Cape to Cairo | -63.13 | 132.3 | 2.9 | **0.8** |
|  |  | Stepping stone | -65.63 | 137.3 | 7.9 | 5.8 |
|  | distance based | **Niche similarity** | **-62.62** | **131.2** | **1.8** | **1.8** |
|  |  | Pure distance | -62.75 | 131.5 | 2.1 | 2.1 |
|  |  | **Niche similarity + pure distance** | **-61.71** | **129.4** | **0** | **0** |
|  |  |  |  |  |  |  |
| **1\_2** |  | No constraint | -64.62 | 135.2 | 17.3 | 11.3 |
|  |  | Max area=2 + adjacency matrix | -58.97 | 123.9 | 6 | 0 |
|  | 0 | Drakensberg melting pot | -64.93 | 135.9 | 18 | 16.9 |
|  |  | Cape to Cairo | -67.88 | 141.8 | 23.9 | 22.8 |
|  |  | Stepping stone | -93.66 | 193.3 | 75.4 | 74.3 |
|  | 0.01 | Drakensberg melting pot | -59.16 | 124.3 | 6.4 | 5.3 |
|  |  | Cape to Cairo | -61.87 | 129.7 | 11.8 | 10.7 |
|  |  | Stepping stone | -69.51 | 145 | 27.1 | 26 |
|  | 0.1 | Drakensberg melting pot | -57.65 | 121.3 | 3.4 | 2.3 |
|  |  | **Cape to Cairo** | **-56.87** | **119.7** | **1.8** | **0.7** |
|  |  | Stepping stone | -62.61 | 131.2 | 13.3 | 12.2 |
|  | 0.25 | Drakensberg melting pot | -57.73 | 121.5 | 3.6 | 2.5 |
|  |  | **Cape to Cairo** | **-56.52** | **119** | **1.1** | **0** |
|  |  | Stepping stone | -60.91 | 127.8 | 9.9 | 8.8 |
|  | 0.5 | Drakensberg melting pot | -58.2 | 122.4 | 4.5 | 3.4 |
|  |  | Cape to Cairo | -57.3 | 120.6 | 2.7 | 1.6 |
|  |  | Stepping stone | -59.85 | 125.7 | 7.8 | 6.7 |
|  | distance based | Niche similarity | -57.19 | 120.4 | 2.5 | 2.5 |
|  |  | **Pure distance** | **-56.85** | **119.7** | **1.8** | **1.8** |
|  |  | **Niche similarity + pure distance** | **-55.93** | **117.9** | **0** | **0** |
|  |  |  |  |  |  |  |
| **1\_o** |  | No constraint | -68.72 | 143.4 | 19.9 | 11.4 |
|  |  | Max area=2 + adjacency matrix | -62.99 | 132 | 8.5 | 0 |
|  | 0 | Drakensberg melting pot | -76 | 158 | 34.5 | 34.5 |
|  |  | Cape to Cairo | -70.11 | 146.2 | 22.7 | 22.7 |
|  |  | Stepping stone | -99.88 | 205.8 | 82.3 | 82.3 |
|  | 0.01 | Drakensberg melting pot | -62.96 | 131.9 | 8.4 | 8.4 |
|  |  | Cape to Cairo | -62.14 | 130.3 | 6.8 | 6.8 |
|  |  | Stepping stone | -72.67 | 151.3 | 27.8 | 27.8 |
|  | 0.1 | Drakensberg melting pot | -61.51 | 129 | 5.5 | 5.5 |
|  |  | **Cape to Cairo** | **-58.73** | **123.5** | **0** | **0** |
|  |  | Stepping stone | -66.31 | 138.6 | 15.1 | 15.1 |
|  | 0.25 | Drakensberg melting pot | -61.65 | 129.3 | 5.8 | 5.8 |
|  |  | **Cape to Cairo** | **-59.45** | **124.9** | **1.4** | **1.4** |
|  |  | Stepping stone | -64.8 | 135.6 | 12.1 | 12.1 |
|  | 0.5 | Drakensberg melting pot | -62.17 | 130.3 | 6.8 | 6.8 |
|  |  | Cape to Cairo | -60.91 | 127.8 | 4.3 | 4.3 |
|  |  | Stepping stone | -63.85 | 133.7 | 10.2 | 10.2 |
|  | distance based | Niche similarity | -60.74 | 127.5 | 4 | 3.5 |
|  |  | Pure distance | -60.57 | 127.1 | 3.6 | 3.1 |
|  |  | **Niche similarity + pure distance** | **-59.02** | **124** | **0.5** | **0** |
|  |  |  |  |  |  |  |
| **2\_1** |  | no constraint | -63.81 | 133.6 | 14.5 | 12.2 |
|  |  | no dispersal constraint | -57.69 | 121.4 | 2.3 | 0 |
|  | 0 | Drakensberg melting pot | -59.72 | 125.4 | 6.3 | 6.2 |
|  |  | Cape to Cairo | -66.2 | 138.4 | 19.3 | 19.2 |
|  |  | Stepping stone | -82.05 | 170.1 | 51 | 50.9 |
|  | 0.01 | Drakensberg melting pot | -58.06 | 122.1 | 3 | 2.9 |
|  |  | Cape to Cairo | -62.03 | 130.1 | 11 | 10.9 |
|  |  | Stepping stone | -67.05 | 140.1 | 21 | 20.9 |
|  | 0.1 | **Drakensberg melting pot** | **-56.59** | **119.2** | **0.1** | **0** |
|  |  | Cape to Cairo | -58.78 | 123.6 | 4.5 | 4.4 |
|  |  | Stepping stone | -59.95 | 125.9 | 6.8 | 6.7 |
|  | 0.25 | **Drakensberg melting pot** | **-56.61** | **119.2** | **0.1** | **0** |
|  |  | **Cape to Cairo** | **-57.5** | **121** | **1.9** | **1.8** |
|  |  | Stepping stone | -58.38 | 122.8 | 3.7 | 3.6 |
|  | 0.5 | **Drakensberg melting pot** | **-57** | **120** | **0.9** | **0.8** |
|  |  | **Cape to Cairo** | **-57.21** | **120.4** | **1.3** | **1.2** |
|  |  | Stepping stone | -57.74 | 121.5 | 2.4 | 2.3 |
|  | distance based | **Niche similarity** | **-57.57** | **121.1** | **2** | **2** |
|  |  | **Pure distance** | **-56.54** | **119.1** | **0** | **0** |
|  |  | **Niche similarity + pure distance** | **-57.18** | **120.4** | **1.3** | **1.3** |
|  |  |  |  |  |  |  |
| **2\_2** |  | no constraint | x | 152.4 | 16.8 | 13.9 |
|  |  | no dispersal constraint | -66.27 | 138.5 | 2.9 | 0 |
|  | 0 | Drakensberg melting pot | -69.74 | 145.5 | 9.9 | 8.5 |
|  |  | Cape to Cairo | -72.49 | 151 | 15.4 | 14 |
|  |  | Stepping stone | -108.4 | 222.8 | 87.2 | 85.8 |
|  | 0.01 | Drakensberg melting pot | -67 | 140 | 4.4 | 3 |
|  |  | Cape to Cairo | -70.19 | 146.4 | 10.8 | 9.4 |
|  |  | Stepping stone | -74.48 | 155 | 19.4 | 18 |
|  | 0.1 | **Drakensberg melting pot** | **-65.54** | **137.1** | **1.5** | **0.1** |
|  |  | Cape to Cairo | -66.7 | 139.4 | 3.8 | 2.4 |
|  |  | Stepping stone | -68.75 | 143.5 | 7.9 | 6.5 |
|  | 0.25 | **Drakensberg melting pot** | **-65.51** | **137** | **1.4** | **0** |
|  |  | **Cape to Cairo** | **-65.57** | **137.1** | **1.5** | **0.1** |
|  |  | Stepping stone | -67.5 | 141 | 5.4 | 4 |
|  | 0.5 | **Drakensberg melting pot** | **-65.79** | **137.6** | **2** | **0.6** |
|  |  | **Cape to Cairo** | **-65.5** | **137** | **1.4** | **0** |
|  |  | Stepping stone | -66.66 | 139.3 | 3.7 | 2.3 |
|  | distance based | **Niche similarity** | **-65.75** | **137.5** | **1.9** | **1.9** |
|  |  | **Pure distance** | **-65.28** | **135.6** | **0** | **0** |
|  |  | **Niche similarity + pure distance** | **-65.18** | **136.4** | **0.8** | **0.8** |
|  |  |  |  |  |  |  |
| **2\_o** |  | no constraint |  | 148.6 | 18 | 13.5 |
|  |  | no dispersal constraint | -64.57 | 135.1 | 4.5 | 0 |
|  | 0 | Drakensberg melting pot | -66.06 | 138.1 | 7.5 | 6.9 |
|  |  | Cape to Cairo | -66.43 | 138.9 | 8.3 | 7.7 |
|  |  | Stepping stone | -96.87 | 199.7 | 69.1 | 68.5 |
|  | 0.01 | Drakensberg melting pot | -64.84 | 135.7 | 5.1 | 4.5 |
|  |  | Cape to Cairo | -64.22 | 134.4 | 3.8 | 3.2 |
|  |  | Stepping stone | -74.9 | 155.8 | 25.2 | 24.6 |
|  | 0.1 | Drakensberg melting pot | -63.66 | 133.3 | 2.7 | 2.1 |
|  |  | **Cape to Cairo** | **-62.88** | **131.8** | **1.2** | 0.6 |
|  |  | Stepping stone | -68.47 | 142.9 | 12.3 | 11.7 |
|  | 0.25 | Drakensberg melting pot | -63.71 | 133.4 | 2.8 | 2.2 |
|  |  | **Cape to Cairo** | **-62.59** | **131.2** | **0.6** | 0 |
|  |  | Stepping stone | -66.85 | 139.7 | 9.1 | 8.5 |
|  | 0.5 | Drakensberg melting pot | -64.04 | 134.1 | 3.5 | 2.9 |
|  |  | **Cape to Cairo** | **-63.14** | **132.3** | **1.7** | 1.1 |
|  |  | Stepping stone | -65.61 | 137.2 | 6.6 | 6 |
|  | distance based | **Niche similarity** | **-63.18** | **132.4** | **1.8** | **1.8** |
|  |  | **Pure distance** | **-62.76** | **131.5** | **0.9** | **0.9** |
|  |  | **Niche similarity + pure distance** | **-62.28** | **130.6** | **0** | **0** |
|  |  |  |  |  |  |  |
| **o\_1** |  | no constraint | -76.11 | 158.2 | 21.1 | 13.5 |
|  |  | no dispersal constraint | -69.33 | 144.7 | 7.6 | 0 |
|  | 0 | Drakensberg melting pot | -78.57 | 163.1 | 26 | 25.5 |
|  |  | Cape to Cairo | -78.26 | 162.5 | 25.4 | 24.9 |
|  |  | Stepping stone | -99.74 | 205.5 | 68.4 | 67.9 |
|  | 0.01 | Drakensberg melting pot | -69.74 | 145.5 | 8.4 | 7.9 |
|  |  | Cape to Cairo | -69.97 | 145.9 | 8.8 | 8.3 |
|  |  | Stepping stone | -77.47 | 160.9 | 23.8 | 23.3 |
|  | 0.1 | Drakensberg melting pot | -68.43 | 142.9 | 5.8 | 5.3 |
|  |  | **Cape to Cairo** | **-65.82** | **137.6** | **0.5** | 0 |
|  |  | Stepping stone | -72.32 | 150.6 | 13.5 | 13 |
|  | 0.25 | Drakensberg melting pot | -68.62 | 143.2 | 6.1 | 5.6 |
|  |  | **Cape to Cairo** | **-66.13** | **138.3** | **1.2** | **0.7** |
|  |  | Stepping stone | -71.46 | 148.9 | 11.8 | 11.3 |
|  | 0.5 | Drakensberg melting pot | -68.98 | 144 | 6.9 | 6.4 |
|  |  | Cape to Cairo | -67.39 | 140.8 | 3.7 | 3.2 |
|  |  | Stepping stone | -70.6 | 147.2 | 10.1 | 9.6 |
|  | distance based | Niche similarity | -66.94 | 139.9 | 2.8 | 2.8 |
|  |  | Pure distance | -67.19 | 140.4 | 3.3 | 3.3 |
|  |  | **Niche similarity + pure distance** | **-65.57** | **137.1** | **0** | **0** |
|  |  |  |  |  |  |  |
| **o\_2** |  | no constraint | -68.75 | 158.2 | 31.9 | 25.6 |
|  |  | no dispersal constraint | -63.31 | 132.6 | 6.3 | 0 |
|  | 0 | Drakensberg melting pot | -69.45 | 144.9 | 18.6 | 18.2 |
|  |  | Cape to Cairo | -70.82 | 147.6 | 21.3 | 20.9 |
|  |  | Stepping stone | -101.2 | 208.4 | 82.1 | 81.7 |
|  | 0.01 | Drakensberg melting pot | -62.61 | 131.2 | 4.9 | 4.5 |
|  |  | Cape to Cairo | -65.03 | 136.1 | 9.8 | 9.4 |
|  |  | Stepping stone | -73.64 | 153.3 | 27 | 26.6 |
|  | 0.1 | Drakensberg melting pot | -61.29 | 128.6 | 2.3 | 1.9 |
|  |  | **Cape to Cairo** | **-60.44** | **126.9** | **0.6** | **0.2** |
|  |  | Stepping stone | -66.54 | 139.1 | 12.8 | 12.4 |
|  | 0.25 | Drakensberg melting pot | -61.58 | 129.2 | 2.9 | 2.5 |
|  |  | **Cape to Cairo** | **-60.37** | **126.7** | **0.4** | **0** |
|  |  | Stepping stone | -64.91 | 135.8 | 9.5 | 9.1 |
|  | 0.5 | Drakensberg melting pot | -62.26 | 130.5 | 4.2 | 3.8 |
|  |  | Cape to Cairo | -61.4 | 128.8 | 2.5 | 2.1 |
|  |  | Stepping stone | -64 | 134 | 7.7 | 7.3 |
|  | distance based | Niche similarity | -61.61 | 129.2 | 2.9 | 2.9 |
|  |  | **Pure distance** | **-60.96** | **127.9** | **1.6** | **1.6** |
|  |  | **Niche similarity + pure distance** | **-60.17** | **126.3** | **0** | **0** |
|  |  |  |  |  |  |  |
| **o\_o** |  | no constraint | -71.04 | 148.1 | 19.7 | 13.7 |
|  |  | no dispersal constraint | -64.2 | 134.4 | 6 | 0 |
|  | 0 | Drakensberg melting pot | -73.69 | 153.4 | 25 | 24 |
|  |  | Cape to Cairo | -72.9 | 151.8 | 23.4 | 22.4 |
|  |  | Stepping stone | -92.02 | 190 | 61.6 | 60.6 |
|  | 0.01 | Drakensberg melting pot | -64.96 | 135.9 | 7.5 | 6.5 |
|  |  | Cape to Cairo | -66.98 | 140 | 11.6 | 10.6 |
|  |  | Stepping stone | -73.31 | 152.6 | 24.2 | 23.2 |
|  | 0.1 | Drakensberg melting pot | -63.45 | 132.9 | 4.5 | 3.5 |
|  |  | **Cape to Cairo** | **-62.06** | **130.1** | **1.7** | **0.7** |
|  |  | Stepping stone | -67.8 | 141.6 | 13.2 | 12.2 |
|  | 0.25 | Drakensberg melting pot | -63.43 | 132.9 | 4.5 | 3.5 |
|  |  | **Cape to Cairo** | **-61.72** | **129.4** | **1** | **0** |
|  |  | Stepping stone | -66.57 | 139.1 | 10.7 | 9.7 |
|  | 0.5 | Drakensberg melting pot | -63.71 | 133.4 | 5 | 4 |
|  |  | Cape to Cairo | -62.51 | 131 | 2.6 | 1.6 |
|  |  | Stepping stone | -65.38 | 136.8 | 8.4 | 7.4 |
|  | distance based | Niche similarity | -62.33 | 130.7 | 2.3 | 2.3 |
|  |  | **Pure distance** | **-62.18** | **130.4** | **2** | **2** |
|  |  | **Niche similarity + pure distance** | **-61.18** | **128.4** | **0** | **0** |

**d) Single best tree - rarefaction, DEC+J model.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 1 - deleted tips:  carnea\_ATsn5, scoparia\_AH, spiculifolia\_AS57234, umbellata\_DS, ciliaris\_c\_ANA, terminalis\_a\_ANA, cinerea\_a\_ANA, multiflora\_a\_ANA, australis\_b\_ANA, hexandra\_RC465, pleiotricha\_RC461, filago\_BG93, occulta\_EO, plumigera\_EO11341, lithophila\_MP1301, brachysepala\_EO12727, doliiformis\_MP797, intermedia\_MM5082, discolor\_heb\_MP1214, astroites\_EO12758, dolfiana\_MP1297, walkeri\_MP1237, transparens\_MP893, bicolor\_MP1098, stagnalis\_sta\_MP668, nudiflora\_MP802, axillaris\_MP1052, adunca\_EO12746, cruenta\_MP745, collina\_EO12613, recurvifolia\_EO12475a, sp\_nov\_MP1291, floccifera\_MP987, copiosa\_BG610, lavandulifolia\_EO12506, colorans\_EO12717, inordinata\_EO11823, fimbriata\_MP606, nevillei\_MP1056, palliiflora\_EO12533, uberiflora\_BG586, abietina\_abi\_MP1013, bruniifolia\_EO12460, parviporandra\_MP877, areolata\_EO12502, brevifolia\_EO12459, physophylla\_EO11418, exleeana\_EO12499, obtusata\_EO12458, versicolor\_ver\_MP1232, pulchella\_MP736, tomentosa\_MP961, chrysocodon\_ANA, strigilifolia\_MP619, savileae\_MP975, hirtiflora\_MP958, totta\_MP525, pogonanthera\_EO12835, patersonii\_a\_ANA, acuta\_MP506, corifolia\_ANA, lanata\_MP1220, eremioides\_MP533, cameronii\_ANA, petrophila\_EO7592, daphniflora\_MP567, quadrisulcata\_MP1031, atrovinosa\_MP864, brachialis\_MP734, curtophylla\_EO12750, leptopus\_ANA, hanekomii\_EO11172, innovans\_MP918, parviflora\_EO12492, baueri\_bau\_MP1233, grata\_MP879, regia\_reg\_MP922, mira\_MP1257, caprina\_EO12772, eustacei\_MP1259, holosericea\_EO12842, verticillata\_ANA, paniculata\_MP1274, patens\_EO12457, autumnalis\_MP665, duthieae\_ANA, chionophila\_MP790, curviflora\_MP765, amoena\_MP1032, adnata\_MP501, lehmannii\_MP625, oxycoccifolia\_MP1275, coccinea\_coc\_MP598, hispiduloides\_EO11544, ecklonii\_EO12739, fastigiata\_MP830, garciae\_MP1253, florifera\_EO12536, trichophora\_EO12701, globiceps\_con\_EO12519, ocellata\_MP574, gnaphaloides\_MP511, erasmia\_MP874, sparsa\_BG602, ventricosa\_MP713, paucifolia\_cil\_EO12528, scytophylla\_MP1021, malmesburiensis\_EO12575, elimensis\_EO12843, coacervata\_MP761, pannosa\_EO12490, leucanthera\_EO12452, haematocodon\_MP1033, oliveri\_MP1278, flacca\_MP840, velatiflora\_EO12547, rugata\_EO12516, passerinae\_MP1302, cumuliflora\_EO12699, fontana\_MP1069, calycina\_EO12532, haemastoma\_MP871, ovina\_EO12487, lateralis\_MP721, accommodata\_EO11382, pinea\_MP789, deflexa\_MP1247, zebrensis\_EO12787, phillipsii\_MP794, montis\_hominis\_EO11827, eriophoros\_EO12478, lachnaeifolia\_MP994, lateriflora\_EO12482, parilis\_MP751, russakiana\_MP684, bokkeveldia\_EO12769, leucopelta\_EO12598, revoluta\_BT13679, evansii\_MP641, frigida\_MP658, rivularis\_BB13936, glaphyra\_MP647, alopecurus\_MP630, algida\_MP645, hillburtii\_EO12593 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -63,29 | 0,0008 | 1,00E-12 | 0,0015 | 132,7 | 15 | 10,2 |
| Max area=2 |  | -63,2 | 8,00E-04 | 1,00E-12 | 0,0015 | 132,5 | 14,8 | 10 |
| Adjacency matrix |  | -58,2 | 2,90E-03 | 1,00E-12 | 0,0013 | 122,5 | 4,8 | 0 |
| Max area=2 + adjacency matrix |  | -58,19 | 2,90E-03 | 1,00E-12 | 0,0013 | 122,5 | 4,8 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -86,77 | 7,10E-03 | 1,00E-12 | 0,16 | 179,6 | 61,9 | 61,9 |
|  | 1 | -63,47 | 6,60E-03 | 1,00E-12 | 0,042 | 133 | 15,3 | 15,3 |
|  | 5 | -58,87 | 6,50E-03 | 1,00E-12 | 0,022 | 123,8 | 6,1 | 6,1 |
|  | 7,5 | -58,2 | 6,40E-03 | 1,00E-12 | 0,016 | 122,5 | 4,8 | 4,8 |
|  | 10 | -57,84 | 6,40E-03 | 1,00E-12 | 0,013 | 121,8 | 4,1 | 4,1 |
|  | 25 | -57,26 | 5,50E-03 | 1,00E-12 | 0,0053 | 120,6 | 2,9 | 2,9 |
|  | 50 | -57,45 | 0,0043 | 1,0e-12 | 0,0026 | 121 | 3,3 | 3,3 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -74,9 | 0,0048 | 0,0008 | 0,0098 | 155,9 | 38,2 | 38,2 |
|  | 1 | -64,81 | 3,30E-03 | 1,00E-12 | 0,0064 | 135,7 | 18 | 18 |
|  | 5 | -60,97 | 3,50E-03 | 1,00E-12 | 0,0055 | 128 | 10,3 | 10,3 |
|  | 7,5 | -60,09 | 3,60E-03 | 1,00E-12 | 0,0051 | 126,3 | 8,6 | 8,6 |
|  | 10 | -59,54 | 3,60E-03 | 1,00E-12 | 0,0047 | 125,1 | 7,4 | 7,4 |
|  | 25 | -58,23 | 3,50E-03 | 1,00E-12 | 0,0034 | 122,5 | 4,8 | 4,8 |
|  | 50 | -57,89 | 3,30E-03 | 1,00E-12 | 0,0022 | 121,8 | 4,1 | 4,1 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -64,64 | 0,0035 | 0,0008 | 0,0073 | 135,4 | 17,7 | 17,7 |
|  | 1 | -57,08 | 2,70E-03 | 1,00E-12 | 0,0067 | 120,2 | 2,5 | 2,5 |
|  | **5** | **-55,83** | **2,80E-03** | **1,00E-12** | **0,005** | **117,7** | **0** | **0** |
|  | **7,5** | **-55,85** | **2,70E-03** | **1,00E-12** | **0,0054** | **117,8** | **0,1** | **0,1** |
|  | **10** | **-55,83** | **2,80E-03** | **1,00E-12** | **0,005** | **117,7** | **0** | **0** |
|  | **25** | **-56,19** | **2,80E-03** | **1,00E-12** | **0,0035** | **118,5** | **0,8** | **0,8** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -56,98 | 0,0029 | 1,00E-12 | 0,0023 | 120 | 2,3 | 2,3 |
|  |  |  |  |  |  |  |  |  |
| **Geographic distance** | **As disp, probability (0 to 1)** | -59,87 | 0,0042 | 1,00E-12 | 0,0022 | 125,8 | 8,1 | 3,4 |
|  | As distance (1 to x) | -67,87 | 3,00E-04 | 1,00E-12 | 1,50E-05 | 141,8 | 24,1 | 19,4 |
|  | As distance ^ -0,25 | -58,34 | 3,60E-03 | 1,00E-12 | 0,0027 | 122,8 | 5,1 | 0,4 |
|  | As distance ^ -1 | -65,02 | 0,0042 | 1,00E-12 | 0,0059 | 136,1 | 18,4 | 13,7 |
|  | As distance ^ -2 | -76,04 | 3,50E-03 | 1,00E-12 | 0,0057 | 158,1 | 40,4 | 35,7 |
| Niche similarity | Schoener‘s D | -58,69 | 5,00E-03 | 1,00E-12 | 0,0026 | 123,4 | 5,7 | 1 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -58,17 | 5,10E-03 | 1,00E-12 | 0,004 | 122,4 | 4,7 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 2 - deleted tips:  maderensis\_AH, ciliaris\_c\_ANA, vagans\_MP972, manipuliflora\_a\_ANA, cinerea\_a\_ANA, tetralix\_c\_ANA, erigena\_a\_ANA, umbellata\_DS, australis\_b\_ANA, whyteana\_A4, hexandra\_RC465, johnstoniana\_RC464, trichophora\_EO12701, verticillata\_ANA, cylindrica\_MP1240, recurvifolia\_EO12475a, oresigena\_MP759, pubescens\_EO12503, spectabilis\_MP929, coacervata\_MP761, perplexa\_EO12788, pogonanthera\_EO12835, bokkeveldia\_EO12769, paniculata\_MP1274, vernicosa\_MP928, rhodopis\_BAB13, remota\_EO10386, dodii\_EO11417, leucosiphon\_MP776, ustulescens\_RT1553, karwyderi\_EO12718, brevifolia\_EO12459, riparia\_MP908, chionodes\_EO11699, copiosa\_BG610, ferrea\_EO12494, trichroma\_EO12517, ovina\_EO12487, desmantha\_MP562, scytophylla\_MP1021, aneimena\_EO12757, ampullacea\_MP1277, sessiliflora\_MP604, plumigera\_EO11341, krugeri\_EO12807, albescens\_MP898, dianthifolia\_MP583, lanata\_MP1220, greyi\_EO12501, densifolia\_BG591, heleogena\_MP1064, pageana\_ANA, sitiens\_MP827, glandulipila\_MP521, bodkinii\_TdV204, caprina\_EO12772, tomentosa\_MP961, spumosa\_MP978, polycoma\_FR, thimifolia\_CM7, tumida\_MP755, capensis\_MP1047, doliiformis\_MP797, glutinosa\_MP687, nutans\_BG599, ardens\_MP1076, agglutinans\_EO7679, pyxidiflora\_ANA, cereris\_MP863, nematophylla\_EO12747, blandfordii\_MM4208, subdivaricata\_MP671, banksii\_com\_ANA, stagnalis\_sta\_MP668, halicacaba\_ANA, barbigeroides\_MP735, nana\_ANA, fontana\_MP1069, discolor\_heb\_MP1214, capillaris\_MP1066, petiolaris\_EO12783, viscaria\_vis\_MdV4, capitata\_ANA, villosa\_EO11394, macowanii\_mac\_MP810, phillipsii\_MP794, multumbellifera\_MP822, russakiana\_MP684, umbratica\_EO12760, baueri\_bau\_MP1233, bolusiae\_ANA, ventricosa\_MP713, rugata\_EO12516, vallis\_fluminis\_EO12761, bruniifolia\_EO12460, lasciva\_MP906, laeta\_MP1045, astroites\_EO12758, subcapitata\_MP1042, garciae\_MP1253, leptopus\_ANA, atrovinosa\_MP864, plukenetii\_plu\_EO, turgida\_S1962, hansfordii\_MP1239, inordinata\_EO11823, vestita\_EO12702, amidae\_EO12272, arachnocalyx\_EO12453, pubigera\_MP572, autumnalis\_MP665, rusticula\_EO12471, deflexa\_MP1247, wendlandiana\_EO12731, acuta\_MP506, argentea\_EO12475, orientalis\_EO12608, curviflora\_MP765, zeyheriana\_EO, humidicola\_EO11353, quadrangularis\_MP620, bolusanthus\_DEB1720, adnata\_MP501, magnisylvae\_EO10708, occulta\_EO, lignosa\_EO11763, denticulata\_MP799, filamentosa\_EO12728, prolata\_EO12748, paucifolia\_cil\_EO12528, holosericea\_EO12842, clavisepala\_ANA, cameronii\_ANA, perspicua\_per\_MP821, gerhardii\_EO12700, chartacea\_EO11408, caffrorum\_MP644, alopecurus\_MP630, algida\_MP645, evansii\_MP641, subverticillaris\_EO12625, holtii\_TO, psittacina\_IJ1237, leucopelta\_EO12598, woodii\_DB1444 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -58,63 | 0,0006 | 1,00E-12 | 0,0017 | 123,3 | 13,7 | 8,8 |
| Max area=2 |  | -58,53 | 6,00E-04 | 1,00E-12 | 0,0017 | 123,1 | 13,5 | 8,6 |
| Adjacency matrix |  | -54,22 | 2,60E-03 | 1,00E-12 | 0,0013 | 114,5 | 4,9 | 0 |
| Max area=2 + adjacency matrix |  | -54,21 | 2,60E-03 | 1,00E-12 | 0,0013 | 114,5 | 4,9 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -83,59 | 1,10E+01 | 1,00E-12 | 0,040 | 173,3 | 63,7 | 63,7 |
|  | 1 | -59,14 | 7,70E-03 | 1,00E-12 | 0,030 | 124,4 | 14,8 | 14,8 |
|  | 5 | -54,61 | 6,80E-03 | 1,00E-12 | 0,017 | 115,3 | 5,7 | 5,7 |
|  | 7,5 | -53,9 | 6,50E-03 | 1,00E-12 | 0,013 | 113,9 | 4,3 | 4,3 |
|  | 10 | -53,53 | 6,20E-03 | 1,00E-12 | 0,011 | 113,1 | 3,5 | 3,5 |
|  | 25 | -53,03 | 5,10E-03 | 1,00E-12 | 0,005 | 112,1 | 2,5 | 2,5 |
|  | 50 | -53,35 | 3,90E-03 | 1,00E-12 | 0,0026 | 112,8 | 3,2 | 3,2 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -69,84 | 0,0045 | 0,0008 | 0,0089 | 145,8 | 36,2 | 36,2 |
|  | 1 | -59,68 | 2,40E-03 | 1,00E-12 | 0,0069 | 125,4 | 15,8 | 15,8 |
|  | 5 | -56,42 | 2,70E-03 | 1,00E-12 | 0,0061 | 118,9 | 9,3 | 9,3 |
|  | 7,5 | -55,68 | 2,70E-03 | 1,00E-12 | 0,0057 | 117,4 | 7,8 | 7,8 |
|  | 10 | -55,21 | 2,80E-03 | 1,00E-12 | 0,0053 | 116,5 | 6,9 | 6,9 |
|  | 25 | -54,14 | 2,80E-03 | 1,00E-12 | 0,0037 | 114,4 | 4,8 | 4,8 |
|  | 50 | -53,93 | 2,80E-03 | 1,00E-12 | 0,0024 | 113,9 | 4,3 | 4,3 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -60,86 | 0,0031 | 0,0008 | 0,0072 | 127,8 | 18,2 | 18,2 |
|  | 1 | -53,01 | 2,30E-03 | 1,00E-12 | 0,0065 | 112,1 | 2,5 | 2,5 |
|  | **5** | **-51,75** | **2,30E-03** | **1,00E-12** | **0,0052** | **109,6** | **0** | **0** |
|  | **7,5** | **-51,77** | **2,30E-03** | **1,00E-12** | **0,0055** | **109,6** | **0** | **0** |
|  | **10** | **-51,75** | **2,30E-03** | **1,00E-12** | **0,0052** | **109,6** | **0** | **0** |
|  | **25** | **-52,16** | **2,40E-03** | **1,00E-12** | **0,0037** | **110,4** | **0,8** | **0,8** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -53,01 | 0,0025 | 1,00E-12 | 0,0024 | 112,1 | 2,5 | 2,5 |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -55,53 | 3,30E-03 | 1,00E-12 | 0,0023 | 117,1 | 7,5 | 2,9 |
|  | As distance (1 to x) | -63,25 | 3,00E-04 | 1,00E-12 | 1,40E-05 | 132,6 | 23 | 18,4 |
|  | As distance ^ -0,25 | -54,21 | 3,10E-03 | 1,00E-12 | 0,0028 | 114,5 | 4,9 | 0,3 |
|  | As distance ^ -1 | -59,81 | 0,0033 | 1,00E-12 | 0,0062 | 125,7 | 16,1 | 11,5 |
|  | As distance ^ -2 | -69,05 | 3,30E-03 | 1,00E-12 | 0,0053 | 144,2 | 34,6 | 30 |
| Niche similarity | Schoener‘s D | -54,65 | 4,40E-03 | 1,00E-12 | 0,0026 | 115,4 | 5,8 | 1,2 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -54,08 | 4,30E-03 | 1,00E-12 | 0,0042 | 114,2 | 4,6 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 3 - deleted tips:  manipuliflora\_a\_ANA, erigena\_a\_ANA, australis\_b\_ANA, vagans\_MP972, ciliaris\_c\_ANA, multiflora\_a\_ANA, carnea\_ATsn5, umbellata\_DS, cinerea\_a\_ANA, trimera\_MsnA, simii\_RC466, microdonta\_A5, adunca\_EO12746, nudiflora\_MP802, flacca\_MP840, praecox\_MP795, spumosa\_MP978, bracteolaris\_MP577, collina\_EO12613, magistrati\_EO11750, brevifolia\_EO12459, abietina\_abi\_MP1013, artemisioides\_MP551, acuta\_MP506, strigosa\_MP673, leonis\_RTsn, turgida\_S1962, caprina\_EO12772, melastoma\_mel\_MP773, ventricosa\_MP713, leucodesmia\_MP724, magnisylvae\_EO10708, triflora\_MP564, interrupta\_MP911, penduliflora\_MP923, palliiflora\_EO12533, parviporandra\_MP877, sparrmanii\_ANA, atrovinosa\_MP864, sessiliflora\_MP604, scytophylla\_MP1021, daphniflora\_MP567, recurvifolia\_EO12475a, vallis\_fluminis\_EO12761, fascicularis\_fac\_MP809, cyrilliflora\_CM10, simulans\_ANA, dolfiana\_MP1297, empetrina\_EO12786, diaphana\_BG611, modesta\_ANA, gibbosa\_ANA, oxycoccifolia\_MP1275, florifera\_EO12536, zeyheriana\_EO, arcuata\_MP523, leucosiphon\_MP776, duthieae\_ANA, rosacea\_gla\_BG628, stokoeanthus\_EO4790, copiosa\_BG610, annectens\_ANA, corydalis\_MP1005, recta\_ANA, garciae\_MP1253, trichophylla\_EO10906, pogonanthera\_EO12835, retorta\_ANA, cumuliflora\_EO12699, cyathiformis\_a\_ANA, maderi\_MP757, hibbertii\_MP982, coarctata\_MP590, riparia\_MP908, exleeana\_EO12499, alfredii\_FR, subulata\_MdV2, bolusanthus\_DEB1720, regerminans\_MP576, albertyniae\_MP927, ampullacea\_MP1277, intermedia\_MM5082, wendlandiana\_EO12731, remota\_EO10386, stagnalis\_sta\_MP668, humifusa\_MP846, pulvinata\_MP1304, goatcheriana\_dra\_EO12694, sonderiana\_MP756, zebrensis\_EO12787, shannonii\_TdV262, angulosa\_S2105, alexandri\_EO12449, prolata\_EO12748, bokkeveldia\_EO12769, russakiana\_MP684, leptopus\_ANA, fausta\_MP663, lucida\_MP690, hottentotica\_EO, monsoniana\_MP986, cereris\_MP863, deflexa\_MP1247, tradouwensis\_MP903, plumigera\_EO11341, fontana\_MP1069, lignosa\_EO11763, accommodata\_EO11382, curvifolia\_MP700, rigidula\_MP534, patersonii\_a\_ANA, ardens\_MP1076, barbigeroides\_MP735, mammosaP\_MP951, ustulescens\_RT1553, peltata\_MP1231, bruniades\_EO12465, gerhardii\_EO12700, squarrosa\_EO11742, pannosa\_EO12490, chrysocodon\_ANA, massonii\_MP811, lasciva\_MP906, pycnantha\_MP1011, setacea\_MP589, propendens\_EO12464, cruenta\_MP745, nubigena\_MP868, paucifolia\_cil\_EO12528, gracilipes\_MM5014, atromontana\_EO12544, lepidota\_MP541, ovina\_EO12487, glabella\_la\_EO11224, physodes\_ANA, velatiflora\_EO12547, frigida\_MP658, dominans\_MP648, drakensbergensis\_DB1443, woodii\_DB1444, tysonii\_EO12583, atherstonei\_EO12261, glaphyra\_MP647, cooperi\_EO12588, oatesii\_ANA | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -62,36 | 0,0008 | 1,00E-12 | 0,0015 | 130,8 | 15,3 | 10,1 |
| Max area=2 |  | -62,31 | 8,00E-04 | 1,00E-12 | 0,0015 | 130,7 | 15,2 | 10,0 |
| Adjacency matrix |  | -57,3 | 2,90E-03 | 1,00E-12 | 0,0013 | 120,7 | 5,2 | 0 |
| Max area=2 + adjacency matrix |  | -57,29 | 2,90E-03 | 1,00E-12 | 0,0013 | 120,7 | 5,2 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -85,17 | 1,10E+01 | 1,00E-12 | 0,050 | 176,4 | 60,9 | 60,9 |
|  | 1 | -62,27 | 7,10E-03 | 1,00E-12 | 0,040 | 130,6 | 15,1 | 15,1 |
|  | 5 | -57,81 | 6,80E-03 | 1,00E-12 | 0,021 | 121,7 | 6,2 | 6,2 |
|  | 7,5 | -57,16 | 6,70E-03 | 1,00E-12 | 0,016 | 120,4 | 4, | 4,9 |
|  | 10 | -56,81 | 6,60E-03 | 1,00E-12 | 0,013 | 119,7 | 4,2 | 4,2 |
|  | 25 | -56,28 | 5,60E-03 | 1,00E-12 | 0,0054 | 118,6 | 3,1 | 3,1 |
|  | 50 | -56,51 | 4,30E-03 | 1,00E-12 | 0,0027 | 119,1 | 3,6 | 3,6 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -61,33 | 0,0027 | 1,00E-12 | 0,01 | 128,7 | 13,2 | 13,2 |
|  | 1 | -58,82 | 3,10E-03 | 1,00E-12 | 0,0095 | 123,7 | 8,2 | 8,2 |
|  | 5 | -57,93 | 3,10E-03 | 1,00E-12 | 0,0082 | 121,9 | 6,4 | 6,4 |
|  | 7,5 | -57,83 | 3,20E-03 | 1,00E-12 | 0,0073 | 121,7 | 6,2 | 6,2 |
|  | 10 | -57,75 | 3,20E-03 | 1,00E-12 | 0,0064 | 121,6 | 6,1 | 6,1 |
|  | 25 | -57,19 | 3,50E-03 | 1,00E-12 | 0,0036 | 120,4 | 4,9 | 4,9 |
|  | 50 | -56,94 | 3,30E-03 | 1,00E-12 | 0,0023 | 120 | 4,5 | 4,5 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | **0** | **-55,23** | **0,0023** | **1,00E-12** | **0,0094** | **116,5** | **1** | **1** |
|  | **1** | **-55,05** | **2,40E-03** | **1,00E-12** | **0,0085** | **116,2** | **0,7** | **0,7** |
|  | **5** | **-54,76** | **2,70E-03** | **1,00E-12** | **0,0053** | **115,6** | **0,1** | **0,1** |
|  | **7,5** | **-54,73** | **2,70E-03** | **1,00E-12** | **0,0058** | **115,5** | **0** | **0** |
|  | **10** | **-54,76** | **2,70E-03** | **1,00E-12** | **0,0053** | **115,6** | **0,1** | **0** |
|  | **25** | **-55,22** | **2,90E-03** | **1,00E-12** | **0,0036** | **116,5** | **1** | **0,9** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -56,04 | 0,0029 | 1,00E-12 | 0,0023 | 118,2 | 2,7 | 2,6 |
|  |  |  |  |  |  |  |  |  |
| **Geographic distance** | **As disp, probability (0 to 1)** | -58,96 | 0,0042 | 1,00E-12 | 0,0022 | 124 | 8,5 | 3,4 |
|  | As distance (1 to x) | -67,06 | 3,00E-04 | 6,90E-11 | 1,60E-05 | 140,2 | 24,7 | 19,6 |
|  | As distance ^ -0,25 | -57,45 | 3,50E-03 | 1,00E-12 | 0,0027 | 121 | 5,5 | 0,4 |
|  | As distance ^ -1 | -64,05 | 0,0041 | 1,00E-12 | 0,006 | 134,2 | 18,7 | 13,6 |
|  | As distance ^ -2 | -73,63 | 3,40E-03 | 1,00E-12 | 0,0057 | 153,3 | 37,8 | 32,7 |
| Niche similarity | Schoener‘s D | -57,81 | 4,90E-03 | 1,00E-12 | 0,0027 | 121,7 | 6,2 | 1,1 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -57,29 | 5,00E-03 | 1,00E-12 | 0,0041 | 120,6 | 5,1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 4 - deleted tips:  spiculifolia\_AS57234, umbellata\_DS, australis\_b\_ANA, manipuliflora\_a\_ANA, scoparia\_AH, mackayana\_b\_ANA, carnea\_ATsn5, terminalis\_a\_ANA, multiflora\_a\_ANA, pleiotricha\_RC461, lanceolifera\_RC463, silvatica\_A2, walkeri\_MP1237, nevillei\_MP1056, tumida\_MP755, accommodata\_EO11382, flacca\_MP840, maderi\_MP757, pogonanthera\_EO12835, shannonii\_TdV262, setacea\_MP589, arachnocalyx\_EO12453, muscosa\_MP775, subcapitata\_MP1042, passerinae\_MP1302, exleeana\_EO12499, condensata\_MP890, anguliger\_MP597, praecox\_MP795, esterhuyseniae\_EO11831, turgida\_S1962, caterviflora\_EO12785, bodkinii\_TdV204, fillipendula\_fil\_MP914, gracilis\_BG622, annectens\_ANA, strigosa\_MP673, trichophylla\_EO10906, eremioides\_MP533, canaliculata\_BG590, adnata\_MP501, bergiana\_MP768, imbricata\_MP688, haemastoma\_MP871, benthamiana\_MP560, glutinosa\_MP687, floccifera\_MP987, montis\_hominis\_EO11827, denticulata\_MP799, phillipsii\_MP794, discolor\_heb\_MP1214, fastigiata\_MP830, corifolia\_ANA, chiroptera\_MP814, petrophila\_EO7592, pannosa\_EO12490, caespitosa\_MP642, caledonica\_JW103, cyrilliflora\_CM10, longimontana\_MP587, oblongiflora\_ANA, simulans\_ANA, curvifolia\_MP700, brevifolia\_EO12459, caprina\_EO12772, colorans\_EO12717, chamissonis\_RT2188, diaphana\_BG611, ocellata\_MP574, sparrmanii\_ANA, clavisepala\_ANA, pubigera\_MP572, dianthifolia\_MP583, leucanthera\_EO12452, halicacaba\_ANA, nutans\_BG599, placentiflora\_EO12477, lepidota\_MP541, collina\_EO12613, corydalis\_MP1005, parviflora\_EO12492, ioniana\_EO12781, regerminans\_MP576, pycnantha\_MP1011, spectabilis\_MP929, tegulifolia\_MP557, desmantha\_MP562, zwartbergensis\_MP608, dolfiana\_MP1297, capensis\_MP1047, ventricosa\_MP713, krugeri\_EO12807, fausta\_MP663, atromontana\_EO12544, karooica\_MP1285, erinus\_MP907, sphaerocephala\_MP848, lucida\_MP690, trichophora\_EO12701, obtusata\_EO12458, madida\_MP573, rosacea\_gla\_BG628, rhodopis\_BAB13, axillaris\_MP1052, hanekomii\_EO11172, steinbergiana\_EO12763, transparens\_MP893, georgica\_ANA, magistrati\_EO11750, urna\_viridis\_MP946, ampullacea\_MP1277, phacelanthera\_EO12489, cumuliflora\_EO12699, oxycoccifolia\_MP1275, grata\_MP879, demissa\_EO12540, copiosa\_BG610, lambertii\_ANA, triflora\_MP564, malmesburiensis\_EO12575, oresigena\_MP759, multumbellifera\_MP822, abietina\_abi\_MP1013, tetrathecoides\_MP1252, eustacei\_MP1259, mira\_MP1257, ustulescens\_RT1553, cristata\_MP820, savileae\_MP975, pubescens\_EO12503, eburnea\_MP1037, gibbosa\_ANA, heleogena\_MP1064, adunca\_EO12746, phaeocarpa\_SM2003, agglutinans\_EO7679, caffrorum\_MP644, holtii\_TO, alopecurus\_MP630, natalitia\_EO12514, oatesii\_ANA, cooperi\_EO12588, woodii\_DB1444, aspalathifolia\_DB1408, reenensis\_MP661 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -58,35 | 0,0006 | 1,00E-12 | 0,0018 | 122,8 | 14,1 | 8,2 |
| Max area=2 |  | -58,28 | 6,00E-04 | 1,00E-12 | 0,0018 | 122,6 | 13,9 | 8 |
| Adjacency matrix |  | -54,24 | 2,40E-03 | 1,00E-12 | 0,0016 | 114,6 | 5,9 | 0 |
| Max area=2 + adjacency matrix |  | -54,24 | 2,40E-03 | 1,00E-12 | 0,0016 | 114,6 | 5,9 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -80,94 | 7,10E-03 | 1,00E-12 | 0,14 | 168 | 59,3 | 59,3 |
|  | 1 | -59,6 | 6,20E-03 | 1,00E-12 | 0,037 | 125,3 | 16,6 | 16,6 |
|  | 5 | -54,63 | 5,80E-03 | 1,00E-12 | 0,020 | 115,3 | 6,6 | 6,6 |
|  | 7,5 | -53,89 | 5,60E-03 | 1,00E-12 | 0,016 | 113,8 | 5,1 | 5,1 |
|  | 10 | -53,5 | 5,40E-03 | 1,00E-12 | 0,013 | 113,1 | 4,4 | 4,4 |
|  | 25 | -53,02 | 4,50E-03 | 1,00E-12 | 0,0061 | 112,1 | 3,4 | 3,4 |
|  | 50 | -53,36 | 3,50E-03 | 1,00E-12 | 0,0032 | 112,8 | 4,1 | 4,1 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -73,25 | 0,0053 | 0,0008 | 0,0084 | 152,6 | 43,9 | 43,9 |
|  | 1 | -60,09 | 2,60E-03 | 1,00E-12 | 0,0069 | 126,3 | 17,6 | 17,6 |
|  | 5 | -56,31 | 2,90E-03 | 1,00E-12 | 0,0061 | 118,7 | 10 | 10 |
|  | 7,5 | -55,47 | 2,90E-03 | 1,00E-12 | 0,0058 | 117 | 8,3 | 8,3 |
|  | 10 | -54,95 | 2,90E-03 | 1,00E-12 | 0,0054 | 116 | 7,3 | 7,3 |
|  | 25 | -53,81 | 2,80E-03 | 1,00E-12 | 0,0039 | 113,7 | 5 | 5 |
|  | 50 | -53,68 | 2,70E-03 | 1,00E-12 | 0,0027 | 113,4 | 4,7 | 4,7 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -60,23 | 0,0031 | 0,0008 | 0,0073 | 126,5 | 17,8 | 17,8 |
|  | 1 | -52,53 | 2,30E-03 | 1,00E-12 | 0,0066 | 111,1 | 2,4 | 2,4 |
|  | **5** | **-51,3** | **2,30E-03** | **1,00E-12** | **0,0053** | **108,7** | **0** | **0** |
|  | **7,5** | **-51,31** | **2,30E-03** | **1,00E-12** | **0,0056** | **108,7** | **0** | **0** |
|  | **10** | **-51,3** | **2,30E-03** | **1,00E-12** | **0,0053** | **108,7** | **0** | **0** |
|  | **25** | **-51,76** | **2,30E-03** | **1,00E-12** | **0,0039** | **109,6** | **0,9** | **0,9** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -52,73 | 0,0024 | 1,00E-12 | 0,0027 | 111,5 | 2,8 | 2,8 |
|  |  |  |  |  |  |  |  |  |
| **Geographic distance** | **As disp, probability (0 to 1)** | **-55,8** | **3,40E-03** | **1,00E-12** | **0,0026** | **117,7** | 9 | 3,9 |
|  | As distance (1 to x) | -64,81 | 3,00E-04 | 1,00E-12 | 1,60E-05 | 135,7 | 27 | 21,9 |
|  | As distance ^ -0,25 | -54,05 | 2,90E-03 | 1,00E-12 | 0,0033 | 114,2 | 5,5 | 0,4 |
|  | As distance ^ -1 | -60,23 | 0,0032 | 1,00E-12 | 0,0074 | 126,5 | 17,8 | 12,7 |
|  | As distance ^ -2 | -71,5 | 2,50E-03 | 1,00E-12 | 0,008 | 149,1 | 40,4 | 35,3 |
| Niche similarity | Schoener‘s D | -54,61 | 4,10E-03 | 1,00E-12 | 0,0032 | 115,3 | 6,6 | 1,5 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -53,86 | 4,20E-03 | 1,00E-12 | 0,0048 | 113,8 | 5,1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 5 - deleted tips:  terminalis\_a\_ANA, umbellata\_DS, carnea\_ATsn5, spiculifolia\_AS57234, scoparia\_AH, mackayana\_b\_ANA, australis\_b\_ANA, erigena\_a\_ANA, ciliaris\_c\_ANA, lanceolifera\_RC463, simii\_RC466, trimera\_MsnA, nematophylla\_EO12747, nabea\_ANA, orientalis\_EO12608, monsoniana\_MP986, jasminiflora\_EO12612, loganii\_MP1258, hansfordii\_MP1239, dolfiana\_MP1297, humifusa\_MP846, bergiana\_MP768, odorata\_MP561, empetrina\_EO12786, haemastoma\_MP871, rhodopis\_BAB13, remota\_EO10386, pyxidiflora\_ANA, viscaria\_vis\_MdV4, platycalyx\_MP1243, strigilifolia\_MP619, stagnalis\_sta\_MP668, conspicua\_CS1, rubiginosa\_RT1554, radicans\_sch\_MP1018, cruenta\_MP745, pinea\_MP789, lambertii\_ANA, urceolata\_MP955, fimbriata\_MP606, ericoides\_MP742, fillipendula\_fil\_MP914, similis\_MP804, garciae\_MP1253, clavisepala\_ANA, phaeocarpa\_SM2003, inflata\_MP784, retorta\_ANA, holosericea\_EO12842, ardens\_MP1076, chionodes\_EO11699, placentiflora\_EO12477, paucifolia\_cil\_EO12528, dregei\_EO12711, incarnata\_EO12771, bruniades\_EO12465, daphniflora\_MP567, intermedia\_MM5082, albertyniae\_MP927, podophylla\_MP582, eriophoros\_EO12478, lepidota\_MP541, saxicola\_EO12515, lavandulifolia\_EO12506, leucodesmia\_MP724, inordinata\_EO11823, tetrathecoides\_MP1252, nemerosa\_MP1208, elimensis\_EO12843, thimifolia\_CM7, adnata\_MP501, corydalis\_MP1005, paniculata\_MP1274, bodkinii\_TdV204, barbigeroides\_MP735, malmesburiensis\_EO12575, tradouwensis\_MP903, fascicularis\_fac\_MP809, magnisylvae\_EO10708, glabella\_la\_EO11224, glandulipila\_MP521, jonasiana\_MP985, prolata\_EO12748, astroites\_EO12758, annectens\_ANA, melanthera\_MP610, lasciva\_MP906, caprina\_EO12772, vallis\_aranearum\_ANA, toringbergensis\_ANA, uysii\_ANA, passerinae\_MP1302, atrovinosa\_MP864, magistrati\_EO11750, artemisioides\_MP551, arcuata\_MP523, sp\_nov\_MP1291, chionophila\_MP790, massonii\_MP811, vestita\_EO12702, distorta\_EO12500, thamnoides\_MP1211, montis\_hominis\_EO11827, labialis\_MP696, juniperina\_SV952, planifolia\_MP1012, globiceps\_con\_EO12519, fausta\_MP663, hanekomii\_EO11172, areolata\_EO12502, gerhardii\_EO12700, regerminans\_MP576, margaritacea\_ANA, walkeri\_MP1237, perspicua\_per\_MP821, brachysepala\_EO12727, haematocodon\_MP1033, fontana\_MP1069, laeta\_MP1045, banksii\_com\_ANA, gracilipes\_MM5014, zwartbergensis\_MP608, caledonica\_JW103, lithophila\_MP1301, plukenetii\_plu\_EO, cumuliflora\_EO12699, heleophila\_ANA, hottentotica\_EO, ventricosa\_MP713, lehmannii\_MP625, eburnea\_MP1037, capensis\_MP1047, canescens\_ANA, umbratica\_EO12760, phacelanthera\_EO12489, glauca\_gla\_MP850, straussiana\_MP638, hillburtii\_EO12593, dissimulans\_EO12596, atherstonei\_EO12261, revoluta\_BT13679, oatesii\_ANA, caffrorum\_MP644, woodii\_DB1444, rivularis\_BB13936 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -63,02 | 0,0008 | 3,00e-10 | 0,0015 | 132,1 | 14,8 | 10,7 |
| Max area=2 |  | -62,95 | 8,00E-04 | 1,00E-12 | 0,0015 | 132 | 14,7 | 10,6 |
| Adjacency matrix |  | -57,66 | 3,20E-03 | 1,00E-12 | 0,0012 | 121,4 | 4,1 | 0 |
| Max area=2 + adjacency matrix |  | -57,66 | 3,20E-03 | 1,00E-12 | 0,0012 | 121,4 | 4,1 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -86,93 | 8,00E-03 | 1,00E-12 | 0,14 | 179,9 | 62,6 | 62,6 |
|  | 1 | -63,4 | 7,10E-03 | 1,00E-12 | 0,041 | 132,9 | 15,6 | 15,6 |
|  | 5 | -58,68 | 7,10E-03 | 1,00E-12 | 0,021 | 123,4 | 6,1 | 6,1 |
|  | 7,5 | -57,96 | 7,10E-03 | 1,00E-12 | 0,015 | 122 | 4,7 | 4,7 |
|  | 10 | -57,55 | 7,00E-03 | 1,00E-12 | 0,012 | 121,2 | 3,9 | 3,9 |
|  | 25 | -56,84 | 6,10E-03 | 1,00E-12 | 0,005 | 119,7 | 2,4 | 2,4 |
|  | 50 | -56,95 | 4,70E-03 | 1,00E-12 | 0,0025 | 120 | 2,7 | 2,7 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -65,25 | 0,0043 | 1,00E-12 | 0,0076 | 136,6 | 19,3 | 19,3 |
|  | 1 | -62,5 | 4,30E-03 | 1,00E-12 | 0,007 | 131,1 | 13,8 | 13,8 |
|  | 5 | -60,32 | 3,90E-03 | 1,00E-12 | 0,0055 | 126,7 | 9,4 | 9,4 |
|  | 7,5 | -59,59 | 3,90E-03 | 1,00E-12 | 0,005 | 125,2 | 7,9 | 7,9 |
|  | 10 | -59,07 | 3,80E-03 | 1,00E-12 | 0,0046 | 124,2 | 6,9 | 6,9 |
|  | 25 | -57,8 | 3,70E-03 | 1,00E-12 | 0,0032 | 121,7 | 4, | 4,4 |
|  | 50 | -57,41 | 3,50E-03 | 1,00E-12 | 0,0021 | 120,9 | 3,6 | 3,6 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -59,32 | 0,0033 | 1,00E-12 | 0,0075 | 124,7 | 7,4 | 7,4 |
|  | 1 | -56,93 | 3,00E-03 | 1,00E-12 | 0,006 | 119,9 | 2,6 | 2,6 |
|  | **5** | **-55,62** | **3,00E-03** | **1,00E-12** | **0,0045** | **117,3** | **0** | **0** |
|  | **7,5** | **-55,67** | **3,00E-03** | **1,00E-12** | **0,0048** | **117,4** | **0,1** | **0,1** |
|  | **10** | **-55,62** | **3,00E-03** | **1,00E-12** | **0,0045** | **117,3** | **0** | **0** |
|  | **25** | **-55,87** | **3,10E-03** | **1,00E-12** | **0,0032** | **117,8** | **0,5** | **0,5** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | **50** | **-56,56** | **0,0031** | **1,00E-12** | **0,0021** | **119,2** | **1,9** | **1,9** |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -59,37 | 4,60E-03 | 1,00E-12 | 0,002 | 124,8 | 7,5 | 3,2 |
|  | As distance (1 to x) | -66,82 | 3,00E-04 | 1,00E-12 | 1,30E-05 | 139,7 | 22,4 | 18,1 |
|  | As distance ^ -0,25 | -57,9 | 3,80E-03 | 1,00E-12 | 0,0026 | 121,9 | 4,6 | 0,3 |
|  | As distance ^ -1 | -64,46 | 0,004 | 1,00E-12 | 0,0069 | 135 | 17,7 | 13,4 |
|  | As distance ^ -2 | -75,39 | 3,80E-03 | 1,00E-12 | 0,0062 | 156,9 | 39,6 | 35,3 |
| Niche similarity | Schoener‘s D | -58,2 | 5,40E-03 | 1,00E-12 | 0,0025 | 122,5 | 5,2 | 0,9 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -57,75 | 5,40E-03 | 1,00E-12 | 0,0039 | 121,6 | 4,3 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree 6 - deleted tips:  umbellata\_DS, sicula\_sic\_AM, erigena\_a\_ANA, cinerea\_a\_ANA, ciliaris\_c\_ANA, maderensis\_AH, terminalis\_a\_ANA, scoparia\_AH, australis\_b\_ANA, kingaensis\_rug\_BB2981, silvatica\_A2, benguelensis\_A1, rigidula\_MP534, juniperina\_SV952, cameronii\_ANA, caledonica\_JW103, amidae\_EO12272, maderi\_MP757, corydalis\_MP1005, parviporandra\_MP877, prolata\_EO12748, georgica\_ANA, fascicularis\_fac\_MP809, cyathiformis\_a\_ANA, placentiflora\_EO12477, floccifera\_MP987, melanthera\_MP610, orientalis\_EO12608, capitata\_ANA, amoena\_MP1032, deflexa\_MP1247, oresigena\_MP759, penduliflora\_MP923, macowanii\_mac\_MP810, rosacea\_gla\_BG628, stylaris\_ANA, accommodata\_EO11382, aneimena\_EO12757, shannonii\_TdV262, thimifolia\_CM7, conspicua\_CS1, sonderiana\_MP756, turgida\_S1962, angulosa\_S2105, loganii\_MP1258, exleeana\_EO12499, depressa\_MP942, passerinae\_MP1302, canaliculata\_BG590, petrophila\_EO7592, paniculata\_MP1274, urceolata\_MP955, hibbertii\_MP982, cubica\_MP623, paucifolia\_cil\_EO12528, pycnantha\_MP1011, colorans\_EO12717, nemerosa\_MP1208, trichroma\_EO12517, dispar\_EO12749, stagnalis\_sta\_MP668, wendlandiana\_EO12731, glutinosa\_MP687, pageana\_ANA, sparrmanii\_ANA, labialis\_MP696, leucanthera\_EO12452, rusticula\_EO12471, lateriflora\_EO12482, selaginifolia\_EO12488, trichophylla\_EO10906, occulta\_EO, hermani\_EO12498, pubigera\_MP572, nematophylla\_EO12747, saxicola\_EO12515, nudiflora\_MP802, gracilis\_BG622, corifolia\_ANA, margaritacea\_ANA, verecunda\_CS5, regia\_reg\_MP922, leucodesmia\_MP724, podophylla\_MP582, bergiana\_MP768, viscaria\_vis\_MdV4, melastoma\_mel\_MP773, montis\_hominis\_EO11827, oxycoccifolia\_MP1275, astroites\_EO12758, palliiflora\_EO12533, pubescens\_EO12503, marifolia\_CM4, calycina\_EO12532, cumuliflora\_EO12699, bodkinii\_TdV204, uberiflora\_BG586, strigosa\_MP673, setacea\_MP589, bicolor\_MP1098, stokoeanthus\_EO4790, distorta\_EO12500, monsoniana\_MP986, pillansii\_pil\_MP813, perspicua\_per\_MP821, sparsa\_BG602, fausta\_MP663, odorata\_MP561, banksii\_com\_ANA, artemisioides\_MP551, chamissonis\_RT2188, trichophora\_EO12701, multumbellifera\_MP822, cetrata\_EO12064, alfredii\_FR, rhodopis\_BAB13, arachnocalyx\_EO12453, collina\_EO12613, inaequalis\_MP539, bracteolaris\_MP577, chionodes\_EO11699, capensis\_MP1047, cristata\_MP820, karwyderi\_EO12718, erinus\_MP907, chartacea\_EO11408, canescens\_ANA, serrata\_MP818, grata\_MP879, copiosa\_BG610, dodii\_EO11417, laeta\_MP1045, parilis\_MP751, stokoei\_MP825, multiflexuosa\_EO12445, massonii\_MP811, aspalathifolia\_DB1408, cooperi\_EO12588, thodei\_MP656, atherstonei\_EO12261, evansii\_MP641, straussiana\_MP638, oatesii\_ANA, drakensbergensis\_DB1443, swaziensis\_L1187 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -61,1 | 0,0007 | 1,0e-12 | 0,0015 | 128,3 | 14,7 | 10,2 |
| Max area=2 |  | -60,96 | 8,00E-04 | 1,00E-12 | 0,0015 | 128 | 14,4 | 9,9 |
| Adjacency matrix |  | -56,02 | 3,10E-03 | 1,00E-12 | 0,0012 | 118,1 | 4,5 | 0 |
| Max area=2 + adjacency matrix |  | -56,01 | 3,10E-03 | 1,00E-12 | 0,0012 | 118,1 | 4,5 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -84,03 | 7,80E-03 | 1,00E-12 | 0,16 | 174,1 | 60,5 | 60,5 |
|  | 1 | -61,5 | 7,20E-03 | 1,00E-12 | 0,041 | 129,1 | 15,5 | 15,5 |
|  | 5 | -56,85 | 7,10E-03 | 1,00E-12 | 0,021 | 119,8 | 6,2 | 6,2 |
|  | 7,5 | -56,16 | 7,00E-03 | 1,00E-12 | 0,015 | 118,4 | 4,8 | 4,8 |
|  | 10 | -55,78 | 6,90E-03 | 1,00E-12 | 0,012 | 117,6 | 4 | 4 |
|  | 25 | -55,15 | 6,00E-03 | 1,00E-12 | 0,0051 | 116,4 | 2,8 | 2,8 |
|  | 50 | -55,3 | 4,60E-03 | 1,00E-12 | 0,0025 | 116,7 | 3,1 | 3,1 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -72,37 | 4,10E-03 | 0,0008 | 0,010 | 150,8 | 37,2 | 37,2 |
|  | 1 | -60,99 | 3,10E-03 | 1,00E-12 | 0,0063 | 128 | 14,4 | 14,4 |
|  | 5 | -58 | 3,30E-03 | 1,00E-12 | 0,0055 | 122,1 | 8,5 | 8,5 |
|  | 7,5 | -57,34 | 3,30E-03 | 1,00E-12 | 0,0051 | 120,8 | 7,2 | 7,2 |
|  | 10 | -56,91 | 3,40E-03 | 1,00E-12 | 0,0047 | 119,9 | 6,3 | 6,3 |
|  | 25 | -55,91 | 3,50E-03 | 1,00E-12 | 0,0033 | 117,9 | 4,3 | 4,3 |
|  | 50 | -55,67 | 3,40E-03 | 1,00E-12 | 0,0022 | 117,4 | 3,8 | 3,8 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -62,86 | 3,70E-03 | 0,0008 | 0,007 | 131,8 | 18,2 | 18,2 |
|  | 1 | -55,04 | 2,80E-03 | 1,00E-12 | 0,0065 | 116,1 | 2,5 | 2,5 |
|  | **5** | **-53,76** | **2,90E-03** | **1,00E-12** | **0,0049** | **113,6** | **0** | **0** |
|  | **7,5** | **-53,79** | **2,80E-03** | **1,00E-12** | **0,0053** | **113,7** | **0,1** | **0,1** |
|  | **10** | **-53,76** | **2,90E-03** | **1,00E-12** | **0,0049** | **113,6** | **0** | **0** |
|  | **25** | **-54,1** | **3,00E-03** | **1,00E-12** | **0,0034** | **114,3** | **0,7** | **0,7** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -54,85 | 3,10E-03 | 1,00E-12 | 0,0022 | 115,8 | 2,2 | 2,2 |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -56,68 | 3,70E-03 | 1,00E-12 | 0,0022 | 119,4 | 5,8 | 1,5 |
|  | As distance (1 to x) | -65,1 | 3,00E-04 | 1,00E-12 | 1,30E-05 | 136,3 | 22,7 | 18,4 |
|  | As distance ^ -0,25 | -56,18 | 3,60E-03 | 1,00E-12 | 0,0026 | 118,4 | 4,8 | 0,5 |
|  | As distance ^ -1 | -61,84 | 3,60E-03 | 1,00E-12 | 0,006 | 129,8 | 16,2 | 11,9 |
|  | As distance ^ -2 | -71,55 | 3,50E-03 | 1,00E-12 | 0,0056 | 149,2 | 35,6 | 31,3 |
| Niche similarity | Schoener‘s D | -56,49 | 5,10E-03 | 1,00E-12 | 0,0025 | 119,1 | 5,5 | 1,2 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -55,93 | 5,00E-03 | 1,00E-12 | 0,004 | 117,9 | 4,3 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree7 - deleted tips:  maderensis\_AH, manipuliflora\_a\_ANA, ciliaris\_c\_ANA, terminalis\_a\_ANA, multiflora\_a\_ANA, umbellata\_DS, erigena\_a\_ANA, sicula\_sic\_AM, mackayana\_b\_ANA, benguelensis\_A1, kingaensis\_rug\_BB2981, microdonta\_A5, blandfordii\_MM4208, podophylla\_MP582, cernua\_EO12474, desmantha\_MP562, stokoei\_MP825, zwartbergensis\_MP608, arachnocalyx\_EO12453, fillipendula\_fil\_MP914, oreotragus\_ANA, exleeana\_EO12499, coarctata\_ANA, plumigera\_EO11341, umbratica\_EO12760, patens\_EO12457, eriophoros\_EO12478, bergiana\_MP768, arcuata\_MP523, margaritacea\_ANA, atromontana\_EO12544, excavata\_GK1532, parviflora\_EO12492, inflata\_MP784, lucida\_MP690, pogonanthera\_EO12835, perlata\_MP960, maximilianii\_EO12484, regerminans\_MP576, bruniifolia\_EO12460, corifolia\_ANA, karooica\_MP1285, maderi\_MP757, hermani\_EO12498, adunca\_EO12746, pillansii\_pil\_MP813, incarnata\_EO12771, petricola\_MP996, penduliflora\_MP923, anguliger\_MP597, humidicola\_EO11353, obtusata\_EO12458, nudiflora\_MP802, uberiflora\_BG586, radicans\_sch\_MP1018, curvirostris\_MP817, fontana\_MP1069, areolata\_EO12502, ocellata\_MP574, melastoma\_mel\_MP773, pannosa\_EO12490, madida\_MP573, odorata\_MP561, tradouwensis\_MP903, hibbertii\_MP982, curviflora\_MP765, longimontana\_MP587, strigosa\_MP673, barbigeroides\_MP735, velatiflora\_EO12547, gibbosa\_ANA, magnisylvae\_EO10708, grata\_MP879, platycalyx\_MP1243, cetrata\_EO12064, sparrmanii\_ANA, petiolaris\_EO12783, ericoides\_MP742, spumosa\_MP978, tomentosa\_MP961, cruenta\_MP745, chionodes\_EO11699, blenna\_ANA, distorta\_EO12500, haematocodon\_MP1033, tristis\_MP932, tetrathecoides\_MP1252, esterhuyseniae\_EO11831, malmesburiensis\_EO12575, alfredii\_FR, cubica\_MP623, chrysocodon\_ANA, planifolia\_MP1012, hansfordii\_MP1239, interrupta\_MP911, glutinosa\_MP687, marifolia\_CM4, rubiginosa\_RT1554, glabella\_la\_EO11224, scytophylla\_MP1021, bolusiae\_ANA, physophylla\_EO11418, paucifolia\_cil\_EO12528, viscaria\_vis\_MdV4, capillaris\_MP1066, amidae\_EO12272, dregei\_EO12711, clavisepala\_ANA, sociorum\_cf\_MP1055, elimensis\_EO12843, ovina\_EO12487, versicolor\_ver\_MP1232, astroites\_EO12758, angulosa\_S2105, viridiflora\_MP1246, muscosa\_MP775, squarrosa\_EO11742, cyathiformis\_a\_ANA, glomiflora\_EO12548, chartacea\_EO11408, ventricosa\_MP713, serrata\_MP818, jonasiana\_MP985, artemisioides\_MP551, halicacaba\_ANA, spectabilis\_MP929, perspicua\_per\_MP821, paniculata\_MP1274, globiceps\_con\_EO12519, caprina\_EO12772, empetrina\_EO12786, vestita\_EO12702, phillipsii\_MP794, macrotrema\_MM4625, lambertii\_ANA, verticillata\_ANA, swaziensis\_L1187, dominans\_MP648, rivularis\_BB13936, evansii\_MP641, cooperi\_EO12588, natalitia\_EO12514, tysonii\_EO12583, algida\_MP645, thodei\_MP656 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -62.63 | 0.0008 | 1,0e-12 | 0,0015 | 131.3 | 15.2 | 10.9 |
| Max area=2 |  | -62,54 | 0,0008 | 1,0e-12 | 0,0015 | 131,1 | 14,9 | 10,7 |
| Adjacency matrix |  | -57,2 | 0,0032 | 1,0e-12 | 0,0012 | 120,5 | 4,3 | 0,1 |
| Max area=2 + adjacency matrix |  | -57,19 | 0,0032 | 1,0e-12 | 0,0012 | 120,4 | 4,2 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -84,96 | 0,0074 | 1,0e-12 | 0,16 | 176 | 59,8 | 59,8 |
|  | 1 | -62,65 | 0,0069 | 1,0e-12 | 0,043 | 131,4 | 15,2 | 15,2 |
|  | 5 | -58,07 | 0,0069 | 1,0e-12 | 0,021 | 122,2 | 6 | 6 |
|  | 7,5 | -57,39 | 0,0069 | 1,0e-12 | 0,016 | 120,9 | 4,7 | 4,7 |
|  | 10 | -57,02 | 0,0068 | 1,0e-12 | 0,012 | 120,1 | 3,9 | 3,9 |
|  | 25 | -56,38 | 0,0060 | 1,0e-12 | 0,0050 | 118,8 | 2,6 | 2,6 |
|  | 50 | -56,5 | 0,0047 | 1,0e-12 | 0,0024 | 119,1 | 2,9 | 2,9 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -74,18 | 0,0049 | 0,0008 | 0,0096 | 154,4 | 38,2 | 38,2 |
|  | 1 | -63,92 | 0,0035 | 1,0e-12 | 0,0062 | 133,9 | 17,7 | 17,7 |
|  | 5 | -60,16 | 0,0037 | 1,0e-12 | 0,0053 | 126,4 | 10,2 | 10,2 |
|  | 7,5 | -59,29 | 0,0038 | 1,0e-12 | 0,0049 | 124,6 | 8,4 | 8,4 |
|  | 10 | -58,73 | 0,0038 | 1,0e-12 | 0,0045 | 123,5 | 7,3 | 7,3 |
|  | 25 | -57,39 | 0,0037 | 1,0e-12 | 0,0032 | 120,9 | 4,7 | 4,7 |
|  | 50 | -56,98 | 0,0036 | 1,0e-12 | 0,0020 | 120 | 3,8 | 3,8 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -63,76 | 0,0036 | 0,0008 | 0,0072 | 133,6 | 17,4 | 17,4 |
|  | 1 | -56,35 | 0,0028 | 1,0e-12 | 0,0066 | 118,8 | 2,6 | 2,6 |
|  | **5** | **-55,07** | **0,0029** | **1,0e-12** | **0,0049** | **116,2** | **0** | **0** |
|  | **7,5** | **-55,11** | **0,0029** | **1,0e-12** | **0,0053** | **116,3** | **0,1** | **0,1** |
|  | **10** | **-55,07** | **0,0029** | **1,0e-12** | **0,0049** | **116,2** | **0** | **0** |
|  | **25** | **-55,4** | **0,0030** | **1,0e-12** | **0,0033** | **116,9** | **0,7** | **0,7** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -56,11 | 0,0031 | 1,0e-12 | 0,0021 | 118,3 | 2,1 | 2,1 |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -58,85 | 0,0045 | 1,0e-12 | 0,0019 | 123,8 | 7,6 | 3,1 |
|  | As distance (1 to x) | -66,16 | 0,0003 | 1,0e-12 | 1,2e-05 | 138,4 | 22,2 | 17,7 |
|  | As distance ^ -0,25 | -57,5 | 0,0038 | 1,0e-12 | 0,0025 | 121,1 | 4,9 | 0,4 |
|  | As distance ^ -1 | -64,28 | 0,0042 | 1,0e-12 | 0,0057 | 134,6 | 18,4 | 13,9 |
|  | As distance ^ -2 | -75,05 | 0,0036 | 1,0e-12 | 0,0054 | 156,2 | 40 | 35,5 |
| Niche similarity | Schoener‘s D | -57,76 | 0,0054 | 1,0e-12 | 0,0024 | 121,6 | 5,4 | 0,9 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -57,34 | 0,0054 | 1,0e-12 | 0,0037 | 120,7 | 4,5 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree8 - deleted tips:  spiculifolia\_AS57234, sicula\_sic\_AM, multiflora\_a\_ANA, ciliaris\_c\_ANA, umbellata\_DS, carnea\_ATsn5, mackayana\_b\_ANA, australis\_b\_ANA, scoparia\_AH, benguelensis\_A1, filago\_BG93, hexandra\_RC465, patersonii\_a\_ANA, tetrathecoides\_MP1252, selaginifolia\_EO12488, monsoniana\_MP986, rubiginosa\_RT1554, similis\_MP804, caterviflora\_EO12785, plukenetii\_plu\_EO, sitiens\_MP827, longimontana\_MP587, bolusiae\_ANA, coacervata\_MP761, karooica\_MP1285, planifolia\_MP1012, lasciva\_MP906, umbelliflora\_RT2182, colorans\_EO12717, zwartbergensis\_MP608, hirtiflora\_MP958, zeyheriana\_EO, daphniflora\_MP567, bergiana\_MP768, oxysepala\_MP780, eriophoros\_EO12478, scytophylla\_MP1021, verecunda\_CS5, retorta\_ANA, setacea\_MP589, ventricosa\_MP713, lucida\_MP690, modesta\_ANA, hispidula\_MP801, subcapitata\_MP1042, curviflora\_MP765, esterhuyseniae\_EO11831, pannosa\_EO12490, hibbertii\_MP982, salteri\_S2065, nana\_ANA, greyi\_EO12501, shannonii\_TdV262, goatcheriana\_dra\_EO12694, oreotragus\_ANA, hermani\_EO12498, lateriflora\_EO12482, ferrea\_EO12494, albens\_ANA, stagnalis\_sta\_MP668, erinus\_MP907, parilis\_MP751, peltata\_MP1231, fimbriata\_MP606, canescens\_ANA, leucanthera\_EO12452, rusticula\_EO12471, pinea\_MP789, toringbergensis\_ANA, chartacea\_EO11408, madida\_MP573, cubica\_MP623, lateralis\_MP721, palliiflora\_EO12533, stokoeanthus\_EO4790, chionophila\_MP790, serrata\_MP818, viscaria\_vis\_MdV4, lavandulifolia\_EO12506, squarrosa\_EO11742, baccans\_BG645, globiceps\_con\_EO12519, macowanii\_mac\_MP810, albescens\_MP898, flacca\_MP840, leucotrachela\_ANA, lepidota\_MP541, pogonanthera\_EO12835, rugata\_EO12516, caespitosa\_MP642, georgica\_ANA, caprina\_EO12772, wendlandiana\_EO12731, multiflexuosa\_EO12445, nervata\_EO12541, rubens\_EO12479, magistrati\_EO11750, thamnoides\_MP1211, melastoma\_mel\_MP773, curtophylla\_EO12750, albertyniae\_MP927, saxicola\_EO12515, uysii\_ANA, glabella\_la\_EO11224, propendens\_EO12464, villosa\_EO11394, gibbosa\_ANA, ecklonii\_EO12739, pillansii\_pil\_MP813, aneimena\_EO12757, maximilianii\_EO12484, steinbergiana\_EO12763, nemerosa\_MP1208, corifolia\_ANA, gerhardii\_EO12700, atromontana\_EO12544, phacelanthera\_EO12489, gracilipes\_MM5014, sparrmanii\_ANA, trichophora\_EO12701, recurvifolia\_EO12475a, simulans\_ANA, leonis\_RTsn, remota\_EO10386, intermedia\_MM5082, regerminans\_MP576, tristis\_MP932, cereris\_MP863, ocellata\_MP574, monadelphia\_FO, chionodes\_EO11699, nubigena\_MP868, nevillei\_MP1056, oliveri\_MP1278, floccifera\_MP987, multumbellifera\_MP822, drakensbergensis\_DB1443, leucopelta\_EO12598, aspalathifolia\_DB1408, thodei\_MP656, tysonii\_EO12583, psittacina\_IJ1237, evansii\_MP641, reenensis\_MP661, natalitia\_EO12514 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -55,6 | 0,0008 | 1,0e-12 | 0,0011 | 117,3 | 12,5 | 10 |
| Max area=2 |  | -55,48 | 0,0008 | 1,0e-12 | 0,0011 | 117 | 12,2 | 9,7 |
| Adjacency matrix |  | -50,61 | 0,0028 | 1,0e-12 | 0,0010 | 107,3 | 2,5 | 0 |
| Max area=2 + adjacency matrix |  | -50,6 | 0,0028 | 1,0e-12 | 0,0010 | 107,3 | 2,5 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| **Stepping Stone (w=1)** | 0 | -66,34 | 0,0088 | 1,0e-12 | 0,028 | 138,7 | 33,9 | 33,9 |
|  | 1 | -54,6 | 0,0071 | 1,0e-12 | 0,030 | 115,3 | 10,5 | 10,5 |
|  | 5 | -50,87 | 0,0070 | 1,0e-12 | 0,015 | 107,8 | 3 | 3 |
|  | 7,5 | -50,3 | 0,0069 | 1,0e-12 | 0,011 | 106,7 | 1,9 | 1,9 |
|  | 10 | -49,99 | 0,0067 | 1,0e-12 | 0,0088 | 106 | 1,2 | 1,2 |
|  | **25** | **-49,52** | **0,0056** | **1,0e-12** | **0,0038** | **105,1** | **0,3** | **0,3** |
|  | **50** | **-49,79** | **0,0042** | **1,0e-12** | **0,0019** | **105,6** | **0,8** | **0,8** |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -69,05 | 0,0045 | 0,0008 | 0,0081 | 144,2 | 39,4 | 39,4 |
|  | 1 | -57,62 | 0,0031 | 1,0e-12 | 0,0046 | 121,3 | 16,5 | 16,5 |
|  | 5 | -54,23 | 0,0034 | 1,0e-12 | 0,0040 | 114,5 | 9,7 | 9,7 |
|  | 7,5 | -53,4 | 0,0034 | 1,0e-12 | 0,0037 | 112,9 | 8,1 | 8,1 |
|  | 10 | -52,84 | 0,0034 | 1,0e-12 | 0,0035 | 111,8 | 7 | 7 |
|  | 25 | -51,37 | 0,0034 | 1,0e-12 | 0,0025 | 108,8 | 4 | 4 |
|  | 50 | -50,72 | 0,0032 | 1,0e-12 | 0,0016 | 107,5 | 2,7 | 2,7 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -58,64 | 0,0036 | 0,0008 | 0,0054 | 123,4 | 18,6 | 18,6 |
|  | 1 | -50,89 | 0,0028 | 1,0e-12 | 0,0049 | 107,9 | 3,1 | 3,1 |
|  | **5** | **-49,37** | **0,0028** | **1,0e-12** | **0,0036** | **104,8** | **0** | **0** |
|  | **7,5** | **-49,46** | **0,0028** | **1,0e-12** | **0,0039** | **105** | **0,2** | **0,2** |
|  | **10** | **-49,37** | **0,0028** | **1,0e-12** | **0,0036** | **104,8** | **0** | **0** |
|  | **25** | **-49,4** | **0,0029** | **1,0e-12** | **0,0025** | **104,9** | **0,1** | **0,1** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | **50** | **-49,82** | **0,0029** | **1,0e-12** | **0,0017** | **105,7** | **0,9** | **0,9** |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -52,04 | 0,0037 | 1,0e-12 | 0,0016 | 110,1 | 5,3 | 1,6 |
|  | As distance (1 to x) | -56,74 | 0,0003 | 1,0e-12 | 1,2e-05 | 119,5 | 14,7 | 11 |
|  | As distance ^ -0,25 | -51,36 | 0,0035 | 1,0e-12 | 0,0020 | 108,8 | 4 | 0,3 |
|  | As distance ^ -1 | -58,24 | 0,0037 | 1,0e-12 | 0,0043 | 122,6 | 17,8 | 14,1 |
|  | As distance ^ -2 | -68,18 | 0,0033 | 1,0e-12 | 0,0039 | 142,4 | 37,6 | 33,9 |
| Niche similarity | Schoener‘s D | -51,41 | 0,0048 | 1,0e-12 | 0,0019 | 108,9 | 4,1 | 0,4 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -51,2 | 0,0049 | 1,0e-12 | 0,0029 | 108,5 | 3,7 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree9 - deleted tips:  vagans\_MP972, mackayana\_b\_ANA, spiculifolia\_AS57234, cinerea\_a\_ANA, tetralix\_c\_ANA, terminalis\_a\_ANA, erigena\_a\_ANA, maderensis\_AH, scoparia\_AH, whyteana\_A4, lanceolifera\_RC463, johnstoniana\_RC464, dregei\_EO12711, villosa\_EO11394, bokkeveldia\_EO12769, coarctata\_MP590, chiroptera\_MP814, petiolaris\_EO12783, nutans\_BG599, odorata\_MP561, heleophila\_ANA, gracilis\_BG622, ardens\_MP1076, rusticula\_EO12471, calcareophila\_EO30159, astroites\_EO12758, paucifolia\_cil\_EO12528, umbelliflora\_RT2182, rubiginosa\_RT1554, perplexa\_EO12788, sitiens\_MP827, blenna\_ANA, cetrata\_EO12064, karooica\_MP1285, sphaerocephala\_MP848, stylaris\_ANA, hendricksei\_EO12524, patens\_EO12457, praecox\_MP795, hottentotica\_EO, areolata\_EO12502, ustulescens\_RT1553, wendlandiana\_EO12731, nana\_ANA, vernicosa\_MP928, uberiflora\_BG586, haematocodon\_MP1033, russakiana\_MP684, colorans\_EO12717, lambertii\_ANA, pubescens\_EO12503, discolor\_heb\_MP1214, sparrmanii\_ANA, cylindrica\_MP1240, cruenta\_MP745, argentea\_EO12475, recurvifolia\_EO12475a, leucanthera\_EO12452, laeta\_MP1045, orientalis\_EO12608, trichroma\_EO12517, baueri\_bau\_MP1233, tradouwensis\_MP903, gibbosa\_ANA, multumbellifera\_MP822, caledonica\_JW103, chionodes\_EO11699, zwartbergensis\_MP608, phacelanthera\_EO12489, massonii\_MP811, dianthifolia\_MP583, subdivaricata\_MP671, oblongiflora\_ANA, equisetifolia\_MP829, serrata\_MP818, caterviflora\_EO12785, perlata\_MP960, spectabilis\_MP929, cernua\_EO12474, umbratica\_EO12760, uysii\_ANA, lateralis\_MP721, petrophila\_EO7592, eburnea\_MP1037, aneimena\_EO12757, stagnalis\_sta\_MP668, stokoeanthus\_EO4790, passerinae\_MP1302, tomentosa\_MP961, unilateralis\_MP1205, obtusata\_EO12458, lignosa\_EO11763, lepidota\_MP541, esterhuyseniae\_EO11831, phillipsii\_MP794, intermedia\_MM5082, magistrati\_EO11750, alfredii\_FR, dolfiana\_MP1297, tumida\_MP755, pycnantha\_MP1011, rubens\_EO12479, prolata\_EO12748, oxysepala\_MP780, inordinata\_EO11823, curviflora\_MP765, sessiliflora\_MP604, brevifolia\_EO12459, transparens\_MP893, accommodata\_EO11382, viridiflora\_MP1246, walkeri\_MP1237, eriophoros\_EO12478, abietina\_abi\_MP1013, bergiana\_MP768, krugeri\_EO12807, melanthera\_MP610, interrupta\_MP911, erinus\_MP907, verecunda\_CS5, nematophylla\_EO12747, sp\_nov\_MP1291, jasminiflora\_EO12612, leptopus\_ANA, oligantha\_TdV86, cristata\_MP820, amidae\_EO12272, placentiflora\_EO12477, desmantha\_MP562, axillaris\_MP1052, pulchella\_MP736, maderi\_MP757, macowanii\_mac\_MP810, maximilianii\_EO12484, curvirostris\_MP817, dodii\_EO11417, drakensbergensis\_DB1443, cooperi\_EO12588, reenensis\_MP661, psittacina\_IJ1237, atherstonei\_EO12261, natalitia\_EO12514, holtii\_TO, thodei\_MP656, swaziensis\_L1187 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -58,8 | 0,0006 | 1,0e-12 | 0,0018 | 123,7 | 14,2 | 8,4 |
| Max area=2 |  | -58,74 | 0,0006 | 1,0e-12 | 0,0018 | 123,6 | 14,1 | 8,3 |
| Adjacency matrix |  | -54,63 | 0,0024 | 1,0e-12 | 0,0015 | 115,3 | 5,8 | 0 |
| Max area=2 + adjacency matrix |  | -54,63 | 0,0024 | 1,0e-12 | 0,0015 | 115,3 | 5,8 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -84,59 | 1,10E+01 | 1,0e-12 | 0,045 | 175,2 | 65,7 | 65,7 |
|  | 1 | -59,81 | 0,0064 | 1,0e-12 | 0,036 | 125,7 | 16,2 | 16,2 |
|  | 5 | -54,95 | 0,0059 | 1,0e-12 | 0,020 | 116 | 6,5 | 6,5 |
|  | 7,5 | -54,22 | 0,0057 | 1,0e-12 | 0,016 | 114,5 | 5 | 5 |
|  | 10 | -53,85 | 0,0055 | 1,0e-12 | 0,013 | 113,8 | 4,3 | 4,3 |
|  | 25 | -53,39 | 0,0045 | 1,0e-12 | 0,0060 | 112,9 | 3,4 | 3,4 |
|  | 50 | -53,74 | 0,0035 | 1,0e-12 | 0,0031 | 113,6 | 4,1 | 4,1 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -70,02 | 0,0047 | 0,0007 | 0,0087 | 146,1 | 36,6 | 36,6 |
|  | 1 | -60,88 | 0,0029 | 1,0e-12 | 0,0071 | 127,8 | 18,3 | 18,3 |
|  | 5 | -56,85 | 0,0029 | 1,0e-12 | 0,0062 | 119,8 | 10,3 | 10,3 |
|  | 7,5 | -55,98 | 0,0029 | 1,0e-12 | 0,0058 | 118 | 8,5 | 8,5 |
|  | 10 | -55,44 | 0,0029 | 1,0e-12 | 0,0054 | 116,9 | 7,4 | 7,4 |
|  | 25 | -54,27 | 0,0028 | 1,0e-12 | 0,0040 | 114,6 | 5,1 | 5,1 |
|  | 50 | -54,11 | 0,0027 | 1,0e-12 | 0,0027 | 114,3 | 4,8 | 4,8 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -60,52 | 0,0031 | 0,0008 | 0,0074 | 127,1 | 17,6 | 17,6 |
|  | 1 | -52,94 | 0,0023 | 1,0e-12 | 0,0067 | 112 | 2,5 | 2,5 |
|  | **5** | **-51,71** | **0,0023** | **1,0e-12** | **0,0053** | **109,5** | **0** | **0** |
|  | **7,5** | **-51,73** | **0,0023** | **1,0e-12** | **0,0057** | **109,5** | **0** | **0** |
|  | **10** | **-51,71** | **0,0023** | **1,0e-12** | **0,0053** | **109,5** | **0** | **0** |
|  | **25** | **-52,18** | **0,0023** | **1,0e-12** | **0,0039** | **110,4** | **0,9** | **0,9** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | **50** | **-53,15** | **0,0023** | **1,0e-12** | **0,0027** | **112,4** | 2,9 | 2,9 |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -56,38 | 0,0035 | 1,0e-12 | 0,0026 | 118,8 | 9,3 | 4,1 |
|  | As distance (1 to x) | -64,34 | 0,0003 | 7,0e-11 | 1,3e-05 | 1,35E+02 | 25,2 | 20 |
|  | As distance ^ -0,25 | -54,5 | 0,0029 | 1,0e-12 | 0,0032 | 115,1 | 5,6 | 0,4 |
|  | As distance ^ -1 | -60,85 | 0,0034 | 1,0e-12 | 0,0072 | 127,8 | 18,3 | 13,1 |
|  | As distance ^ -2 | -72,93 | 0,0030 | 1,0e-12 | 0,0070 | 151,9 | 42,4 | 37,2 |
| Niche similarity | Schoener‘s D | -55,05 | 0,0041 | 1,0e-12 | 0,0031 | 116,2 | 6,7 | 1,5 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -54,33 | 0,0041 | 1,0e-12 | 0,0047 | 114,7 | 5,2 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pruned tree10 - deleted tips:  spiculifolia\_AS57234, tetralix\_c\_ANA, sicula\_sic\_AM, erigena\_a\_ANA, carnea\_ATsn5, vagans\_MP972, multiflora\_a\_ANA, umbellata\_DS, cinerea\_a\_ANA, thomensis\_EO12615, silvatica\_A2, simii\_RC466, verecunda\_CS5, vallis\_fluminis\_EO12761, orientalis\_EO12608, velatiflora\_EO12547, maximilianii\_EO12484, distorta\_EO12500, bolusiae\_ANA, bicolor\_MP1098, nabea\_ANA, planifolia\_MP1012, dolfiana\_MP1297, stagnalis\_sta\_MP668, adunca\_EO12746, glutinosa\_MP687, sonderiana\_MP756, garciae\_MP1253, jasminiflora\_EO12612, nubigena\_MP868, physodes\_ANA, albescens\_MP898, corifolia\_ANA, glandulipila\_MP521, amidae\_EO12272, obtusata\_EO12458, sessiliflora\_MP604, blandfordii\_MM4208, caledonica\_JW103, macrotrema\_MM4625, multiflexuosa\_EO12445, argentea\_EO12475, leptopus\_ANA, brachialis\_MP734, selaginifolia\_EO12488, wendlandiana\_EO12731, polycoma\_FR, nudiflora\_MP802, perlata\_MP960, setacea\_MP589, bruniifolia\_EO12460, parilis\_MP751, oligantha\_TdV86, capensis\_MP1047, pageana\_ANA, greyi\_EO12501, chartacea\_EO11408, interrupta\_MP911, pannosa\_EO12490, angulosa\_S2105, infundibuliformis\_MP1238, capitata\_ANA, equisetifolia\_MP829, lanata\_MP1220, heleophila\_ANA, vernicosa\_MP928, dregei\_EO12711, unicolor\_uni\_MP1249, pulvinata\_MP1304, tegulifolia\_MP557, saxicola\_EO12515, hibbertii\_MP982, bodkinii\_TdV204, vallis\_aranearum\_ANA, stylaris\_ANA, gracilipes\_MM5014, riparia\_MP908, simulans\_ANA, podophylla\_MP582, shannonii\_TdV262, subcapitata\_MP1042, incarnata\_EO12771, prolata\_EO12748, trichophylla\_EO10906, pinea\_MP789, hansfordii\_MP1239, odorata\_MP561, canescens\_ANA, remota\_EO10386, cristata\_MP820, adnata\_MP501, eremioides\_MP533, cernua\_EO12474, esterhuyseniae\_EO11831, agglutinans\_EO7679, goatcheriana\_dra\_EO12694, junonia\_min\_MP866, tomentosa\_MP961, glomiflora\_EO12548, rubiginosa\_RT1554, fimbriata\_MP606, propendens\_EO12464, bracteolaris\_MP577, juniperina\_SV952, florifera\_EO12536, paniculata\_MP1274, loganii\_MP1258, ustulescens\_RT1553, chionodes\_EO11699, fascicularis\_fac\_MP809, perplexa\_EO12788, physantha\_MP1242, trichroma\_EO12517, lignosa\_EO11763, densifolia\_BG591, sparsa\_BG602, acuta\_MP506, curviflora\_MP765, maderi\_MP757, sp\_pachysa\_EO12720, hispiduloides\_EO11544, duthieae\_ANA, mira\_MP1257, calcareophila\_EO30159, coacervata\_MP761, intermedia\_MM5082, laeta\_MP1045, curvirostris\_MP817, copiosa\_BG610, viscaria\_vis\_MdV4, similis\_MP804, arachnocalyx\_EO12453, hanekomii\_EO11172, oxycoccifolia\_MP1275, chiroptera\_MP814, serrata\_MP818, dominans\_MP648, hillburtii\_EO12593, algida\_MP645, subverticillaris\_EO12625, swaziensis\_L1187, thodei\_MP656, aspalathifolia\_DB1408, caffrorum\_MP644, glaphyra\_MP647 | | | | | | | | |
| **Model** | **Dispersal multiplier** | **LnL** | **d [1/Ma]** | **e [1/Ma]** | **j** | **AIC** | **deltaAIC overall** | **deltaAIC per comparison** |
| no constraint |  | -59,56 | 0,0006 | 1,0e-12 | 0,0018 | 125,2 | 14,2 | 8,2 |
| Max area=2 |  | -59,5 | 0,0006 | 1,0e-12 | 0,0018 | 125,1 | 14,1 | 8,1 |
| Adjacency matrix |  | -55,48 | 0,0024 | 1,0e-12 | 0,0016 | 117 | 6 | 0 |
| Max area=2 + adjacency matrix |  | -55,48 | 0,0024 | 1,0e-12 | 0,0016 | 117 | 6 | 0 |
|  |  |  |  |  |  |  |  |  |
| **The following models are based on the best model above** | | | | | | | | |
| Stepping Stone (w=1) | 0 | -84,52 | 1,10E+01 | 1,0e-12 | 0,054 | 175,1 | 64,1 | 64,1 |
|  | 1 | -60,62 | 0,0065 | 1,0e-12 | 0,037 | 127,3 | 16,3 | 16,3 |
|  | 5 | -55,71 | 0,0061 | 1,0e-12 | 0,020 | 117,5 | 6,5 | 6,5 |
|  | 7,5 | -54,99 | 0,0059 | 1,0e-12 | 0,016 | 116 | 5 | 5 |
|  | 10 | -54,61 | 0,0056 | 1,0e-12 | 0,013 | 115,3 | 4,3 | 4,3 |
|  | 25 | -54,18 | 0,0046 | 1,0e-12 | 0,0062 | 114,4 | 3,4 | 3,4 |
|  | 50 | -54,56 | 0,0036 | 1,0e-12 | 0,0032 | 115,2 | 4,2 | 4,2 |
|  |  |  |  |  |  |  |  |  |
| Cape to Cairo (w=1) | 0 | -74,41 | 0,0054 | 0,0008 | 0,0084 | 154,9 | 43,9 | 43,9 |
|  | 1 | -61,12 | 0,0026 | 1,0e-12 | 0,0070 | 128,3 | 17,3 | 17,3 |
|  | 5 | -57,46 | 0,0029 | 1,0e-12 | 0,0062 | 121 | 10 | 10 |
|  | 7,5 | -56,64 | 0,0029 | 1,0e-12 | 0,0058 | 119,4 | 8,4 | 8,4 |
|  | 10 | -56,12 | 0,0029 | 1,0e-12 | 0,0055 | 118,3 | 7,3 | 7,3 |
|  | 25 | -55,01 | 0,0029 | 1,0e-12 | 0,0040 | 116,1 | 5,1 | 5,1 |
|  | 50 | -54,89 | 0,0027 | 1,0e-12 | 0,0027 | 115,9 | 4,9 | 4,9 |
|  |  |  |  |  |  |  |  |  |
| **Drakensberg Melting-pot (w=1)** | 0 | -61,23 | 0,0032 | 0,0008 | 0,0074 | 128,5 | 17,5 | 17,5 |
|  | 1 | -53,7 | 0,0023 | 1,0e-12 | 0,0067 | 113,5 | 2,5 | 2,5 |
|  | **5** | **-52,47** | **0,0024** | **1,0e-12** | **0,0054** | **111** | **0** | **0** |
|  | **7,5** | **-52,49** | **0,0024** | **1,0e-12** | **0,0057** | **111** | **0** | **0** |
|  | **10** | **-52,47** | **0,0024** | **1,0e-12** | **0,0054** | **111** | **0** | **0** |
|  | **25** | **-52,95** | **0,0024** | **1,0e-12** | **0,0040** | **112** | **1** | **1** |
| (E, aborea European) | 25 |  |  |  |  |  |  |  |
| w =0,8 | 25 |  |  |  |  |  |  |  |
| w =0,5 | 25 |  |  |  |  |  |  |  |
| w =0,1 | 25 |  |  |  |  |  |  |  |
|  | 50 | -53,94 | 0,0024 | 1,0e-12 | 0,0027 | 114 | 3 | 3 |
|  |  |  |  |  |  |  |  |  |
| Geographic distance | As disp, probability (0 to 1) | -56,98 | 0,0033 | 1,0e-12 | 0,0027 | 120 | 9 | 3,7 |
|  | As distance (1 to x) | -66,15 | 0,0003 | 1,0e-12 | 1,8e-05 | 138,4 | 27,4 | 22,1 |
|  | As distance ^ -0,25 | -55,29 | 0,0029 | 1,0e-12 | 0,0033 | 116,6 | 5,6 | 0,3 |
|  | As distance ^ -1 | -61,4 | 0,0031 | 1,0e-12 | 0,0075 | 128,9 | 17,9 | 12,6 |
|  | As distance ^ -2 | -72,43 | 0,0025 | 1,0e-12 | 0,0080 | 150,9 | 39,9 | 34,6 |
| Niche similarity | Schoener‘s D | -55,87 | 0,0041 | 1,0e-12 | 0,0033 | 117,8 | 6,8 | 1,5 |
| Niche plus distance as multipl, | As disp, probability/distance matrix | -55,1 | 0,0042 | 1,0e-12 | 0,0048 | 116,3 | 5,3 | 0 |