# Appendage 1

Genera included in the track analysis, and their assignations to floras from the cluster analysis.

Lowland forest flora

*Airyantha, Allanblackia, Anisopus, Anisosepalum, Anthocleista, Aoranthe, Apodiscus, Aptandra, Ardisia, Atroxima, Bafodeya, Begonia, Buchnerodendron, Byrsanthus, Byttneria, Calycosiphonia, Carpolobia, Chidlowia, Chrysobalanus, Cnestis, Connarus, Crossostemma, Crotonogynopsis, Cyclocotyla, Cylindropsis, Decorsella, Desbordesia, Dewevrella, Dichapetalum, Dictyophleba, Diospyros, Endodesmia, Farquharia, Fegimanra, Funtumia, Garcinia, Globimetula, Gymnostemon, Haplormosia, Hemandradenia, Holarrhena, Hutchinsonia, Hymenocoleus, Irvingia, Isonema, Ixora, Jollydora, Keayodendron, Lasiodiscus, Lebrunia, Leucomphalos, Licania, Lindernia, Lophira, Maesopsis, Magnistipula, Malouetia, Manotes, Maranthes, Martretia, Maschalocephalus, Michelsonia, Microcoelia, Milicia, Monocyclanthus, Mostuea, Motandra, Necepsia, Neocarya, Nothospondias, Oberonia, Octolepis, Oncinotis, Paramacrolobium, Parapentas, Pararistolochia, Parinari, Penianthus, Pentadesma, Petersianthus, Petitiocodon, Phragmanthera, Pierreodendron, Pleioceras, Pleiocoryne, Poggea, Pogonophora, Polystemonanthus, Preussiodora, Pseudoprosopis, Pycnobotrya, Rhodognaphalon, Robynsia, Sacoglottis, Schefflera, Selaginella, Sphenocentrum, Spigelia, Spondianthus, Staurogyne, Strophanthus, Strychnos, Tapura, Trema, Tricalysia, Triphyophyllum, Usteria, Vahadenia, Voacanga, Zenkerella.*

Tropic-montane flora

*Adenium, Ansellia, Arceuthobium, Barbeya, Blaeria, Bottegoa, Capsella, Carphalea, Carvalhoa, Caucalis, Cephalosphaera, Colpodium, Cometes, Craterostigma, Cryptotaenia, Cussonia, Deschampsia, Dombeya, Ellipanthus, Embelia, Emelianthe, Endostemon, Englerina, Erianthemum, Hagenia, Haplocoelopsis, Helixanthera, Hirtella, Hypericum, Impatiens, Korthalsella, Lecaniodiscus, Lettowianthus, Linociera, Maesa, Mesogyne, Najas, Olea, Oliverella, Oncella, Oncocalyx, Paederia, Pedistylis, Peucedanum, Phaenanthoecium, Polyscias, Reichardia, Rourea, Saba, Schizozygia, Scorodophloeus, Scrophularia, Snowdenia, Spragueanella, Vismia, Vismianthus.*

Savanna flora

*Aizoanthemum, Anticharis, Antiphiona, Arthraerua, Augea, Blepharis, Chaetobromus, Crotalaria, Cucumella, Dyerophytum, Ectadium, Forsskaolea, Juttadinteria, Kaokochloa, Kirkia, Lavrania, Manuleopsis, Namacodon, Namibia, Ondetia, Peristrophe, Phlyctidocarpa, Sisyndite, Tapinanthus.*

Austro-temperate flora

*Acampe, Acrolophia, Agelanthus, Alberta, Anacampseros, Anthochortus, Anthospermum, Askidiosperma, Aulax, Bartholina, Bartsia, Bonatea, Brabejum, Brownleea, Buddleja, Calanthe, Calopsis, Cannomois, Carpacoce, Ceratandra, Ceratocaryum, Chondropetalum, Corycium, Cyanella, Cynanchum, Diastella, Disa, Elegia, Emex, Euchaetis, Evotella, Galium, Galopina, Gomphostigma, Herschelianthe, Huttonaea, Hydrophilus, Hyparrhenia, Hypodiscus, Ischyrolepis, Lachnagrostis, Leucadendron, Leucospermum, Mastersiella, Metalasia, Mimetes, Monadenia, Monsonia, Moquiniella, Moraea, Mystacidium, Nenax, Nevillea, Nuxia, Orobanche, Pachites, Pachycarpus, Paranomus, Pentaschistis, Platycaulos, Protea, Ptaeroxylon, Pterygodium, Restio, Retzia, Rhodocoma, Schizochilus, Schizodium, Seemannaralia, Septulina, Serruria, Sorocephalus, Spatalla, Staberoha, Stenoglottis, Thamnochortus, Vexatorella, Viscum, Watsonia, Willdenowia, Xiphotheca, Zygophyllum.*

Unassigned

*Actinanthella, Alhagi, Anastatica, Anogeissus, Batopedina, Berhautia, Burttia, Calligonum, Caulinia, Chamaeclitandra, Crateva, Crepidorhopalon, Cressa, Crypsis, Eminia, Faroa, Guiera, Jodrellia, Lasiurus, Louisiella, Mayaca, Melanocenchris, Mitragyna, Mitreola, Nucularia, Ochthochloa, Otiophora, Philenoptera, Pseudocedrela, Rogeria, Schouwia, Securidaca, Sericanthe, Solenostemma, Thecorchus, Urochondra, Vanwykia.*

# Appendage 2

Appendix 2: Clades, ages and references used in the analysis of the age and diversification rates of the African floras.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Clade | Flora | Crown age | Stem age | Richness | Sister Region | Reference | Notes |
| *Coccinia* | Arid | 2.5 |  | 6 | Africa | ([Holstein and Renner, 2011](#_ENREF_18)) | derived from savanna. |
| *Commiphora* | Arid | 27.8 ⁺₋ 4.5 | 47.5⁺₋4.5 | 150 | Americas | ([Weeks and Simpson, 2007](#_ENREF_42)) | Typical of fire-free arid systems |
| *Cyphostemma* | Arid | 34.3 (22.3-47.0) |  | 106 | Asia | ([Lu et al., 2013](#_ENREF_26)) |  |
| *Euphorbia* Clade C1 pp | Arid | 5 |  |  | Asia | ([Bruyns et al., 2011](#_ENREF_6)) |  |
| *Euphorbia* Clade C2 pp | Arid | 5 |  |  | South America | ([Bruyns et al., 2011](#_ENREF_6)) |  |
| Moringaceae | Arid | 14.7 |  | 14 | Africa | ([Carvalho and Renner, 2012](#_ENREF_10)) | Sister to Caricaceae, inadequately sampled; indirect dating in Caricaceae paper |
| *Thamnosma* | Arid | 8 (5.3-12.1) |  | 6 | America | ([Thiv et al., 2011](#_ENREF_36)) | Arid Track |
| *Wajira* | Arid | 6(5-7) | 10.7 | 5 |  | ([Thulin et al., 2004](#_ENREF_38)) |  |
| Crocoideae | austro-temperate | 40 |  | 1080 | Australia | ([Goldblatt and Manning, 2008](#_ENREF_15); [Goldblatt et al., 2008](#_ENREF_16)) |  |
| Crotalareae | austro-temperate | 44⁺₋2.3 |  | 497 |  | ([Lavin et al., 2005](#_ENREF_23)) | *Crotalaria* radiated in Savanna |
| Danthonioidaea | austro-temperate | 22 |  | 134 | Africa | ([Linder et al., 2013](#_ENREF_24)) |  |
| *Disa* | austro-temperate | 19.5 (10.2-30) |  | 208 | Africa | ([Bytebier et al., 2010](#_ENREF_8)) | Dating based on [Ramirez et al. (2007)](#_ENREF_32). |
| *Ehrharta* | austro-temperate | 35 | 40.9(31.6-41.3) | 39 | Australia | ([Verboom et al., 2003](#_ENREF_41)) | Age estimate from [Verboom et al. (2009)](#_ENREF_40) |
| *Euphorbia* clade A | austro-temperate | 20 |  |  |  | ([Bruyns et al., 2011](#_ENREF_6)) | Complex story, with stem ages of from the Oligocene |
| *Heliophila* | austro-temperate | 1.5 (0.7-2.5) |  | 80 | Eurasia | ([Mummenhoff et al., 2005](#_ENREF_30)), | This estimate based on [Verboom et al. (2009)](#_ENREF_40) sister is globally distributed Aphragmeae ([Couvreur et al., 2010](#_ENREF_11)) |
| *Indigofera* | austro-temperate | 13.1 |  | 490 | Africa | ([Schrire et al., 2003](#_ENREF_34)) |  |
| Irideae | austro-temperate | 35 |  | 233 | Australia | ([Goldblatt and Manning, 2008](#_ENREF_15); [Goldblatt et al., 2008](#_ENREF_16)) |  |
| *Leucadendrii* | austro-temperate | 30.3 (29.3-39.3) | 37.3(29.3-46.2) | 286 | Australia | ([Sauquet et al., 2009](#_ENREF_33)) | All details well supported |
| *Melianthus* | austro-temperate | 17.2 (5.7-26.8) | 34.0(19.4-56.8) | 8 | African | ([Linder et al., 2006](#_ENREF_25)) | Age estimates from [Verboom et al. (2009)](#_ENREF_40) |
| Mesembryanthemoideae | austro-temperate | 6.2 (3.8-8.7) |  | 1500 | Africa | ([Klak et al., 2004](#_ENREF_20)) |  |
| *Muraltia* | austro-temperate | 10.9 (8.6-16.4) | 18.5(14.1-23.3) | 124 | Africa | ([Forest et al., 2007](#_ENREF_14)) | May have diverged from African *Polygala* species, age estimate from [Verboom et al. (2009)](#_ENREF_40) |
| *Pelargonium* | austro-temperate | 31.9 (15.2-39.2) | 43.0(26.6-52.7) | 293 | Africa | ([Bakker et al., 2005](#_ENREF_2)) | Age estimates from [Verboom et al. (2009)](#_ENREF_40) |
| Proteaea | austro-temperate | 28.2 (20.2-37.1) | 72.7(67.6-77.9) | 159 | Australia | ([Sauquet et al., 2009](#_ENREF_33)) | All details well supported |
| Restionoideae | austro-temperate | 61.3 (31.7-65.4) | 91.5(70.8-106.9) | 350 | Australia | ([Hardy et al., 2008](#_ENREF_17)) | Age estimates from [Verboom et al. (2009)](#_ENREF_40) |
| *Satyrium* | austro-temperate | 14.4 | 31.02 | 109 | African | ([van der Niet et al., 2005](#_ENREF_39)) | Age estimates from [Verboom et al. (2009)](#_ENREF_40) |
| *Scabiosa* | austro-temperate | 1.5 (0.7-2.6) |  | 14 | Eurasia | ([Carlson et al., 2012](#_ENREF_9)) | Afromontane grassland to CFR |
| Tecophilaeaceae | austro-temperate | 42 | 68-69 | 4 | Africa | ([Buerki et al., 2013](#_ENREF_7)) |  |
| Tecophilaeaceae | austro-temperate | 34 |  | 5 | Africa | ([Buerki et al., 2013](#_ENREF_7)) | Embedded in Arid radiation in Africa |
| *Wahlenbergia* | austro-temperate | 23.6 (15.3-45.3) |  | 254 |  | ([Prebble et al., 2011](#_ENREF_31)) | Age of main group, mostly southern Africa, sampling poor. Not sure about the African distribution |
| *Zaluzianskya* | austro-temperate | 3.0 (1.9-4.3) | 4.5(2.8-5.9) | 61 | African | ([Verboom et al., 2009](#_ENREF_40)) | Age estimates from [Verboom et al. (2009)](#_ENREF_40) |
| Zygophylloideae | austro-temperate | 53 (17.1-69.4) |  |  | Asia | ([Bellstedt et al., 2012](#_ENREF_4)) |  |
| *Acridocarpus* | lowland forest | 55 |  | 20 | South America | ([Davis et al., 2002](#_ENREF_13)) | Assuming 5 spp in savanna |
| Annonaceae | lowland forest | 90.4 | 92.98-89 | 448 | Africa | ([Couvreur et al., 2011](#_ENREF_12)) | Stem c. 110 Ma |
| *Begonia* | lowland forest | 22.3 (15.2-29.5) |  | 116 | Hawaii | ([Thomas et al., 2012](#_ENREF_37)) |  |
| *Berlinia* | lowland forest | 10 |  | 16 | Africa | ([Simon et al., 2009](#_ENREF_35)) | Paraphyletic, west African rainforest |
| Caesalpinoid | lowland forest | 29.2⁺₋1.2 |  | 200 | South America | ([Lavin et al., 2005](#_ENREF_23)) | *Brachystegia* and *Colopho*-*spermum* radiated later in savanna. |
| Caricaceae | lowland forest | 51 (35-67) |  | 2 | Africa | ([Carvalho and Renner, 2012](#_ENREF_10)) | submontane rainforest in Africa, parallels to *Dorstenia* |
| *Coccinia* | lowland forest | 13.5 |  | 13 | Asia | ([Holstein and Renner, 2011](#_ENREF_18)) |  |
| *Dorstenia* | lowland forest | 112.3 (84.8-132) |  | 60 | Africa | ([Misiewicz and Zerega, 2012](#_ENREF_28)) | No dates for the shift to Socotra and the arid habitats. |
| Mimosoideae | lowland forest | 59.5 (58-61.8) |  |  | Africa | ([Bouchenak-Khelladi et al., 2010](#_ENREF_5)) | Complex pattern of dispersals between Africa and South America |
| Sapotaceae | lowland forest | 77.8 (72.9-82.7) |  | 302 | AsiaTrop | ([Bartish et al., 2010](#_ENREF_3)) | Ancestral node of family African |
| *Acridocarpus* | Savanna | 20 (17-23) |  | 5 | Africa | ([Davis et al., 2002](#_ENREF_13)) | Embedded in rainforest lineage |
| *Brachystegia* | Savanna | 10.01 |  | 46 | Africa | ([Simon et al., 2009](#_ENREF_35)) | Crown of whole genus, so savanna a bit younger. Embedded in an African clade |
| *Cayratia* | Savanna | 23.2 (11.4-38.0) |  | 7 | Asia | ([Lu et al., 2013](#_ENREF_26)) | Assignment dubious |
| *Coccinia* | Savanna | 8 |  | 9 | Africa | ([Holstein and Renner, 2011](#_ENREF_18)) | Derived from rainforest |
| *Crotalaria* | Savanna | 13.7 | 27.5 | 628 | Africa | ([Simon et al., 2009](#_ENREF_35)) |  |
| *Isoberlinia* | Savanna | 2.3 |  | 9 | Africa | ([Simon et al., 2009](#_ENREF_35)) | Deciduous woodland, the sister is *Englerodendron* from Tanzanian rainforest |
| *Senegalia* | Savanna | 10 | 20 | 66 | South America | ([Bouchenak-Khelladi et al., 2010](#_ENREF_5)) | Species numbers from [Kyalangalilwa et al. (2013)](#_ENREF_22), but not counting infraspecific taxa |
| Tecophilaeaceae | Savanna | 67 |  | 4 | South America | ([Buerki et al., 2013](#_ENREF_7)) | Inclusion of this datapoint causes havoc. |
| *Vachellia* | Savanna | 16.7 (13.5-23.3) | 37 | 77 | Africa | ([Bouchenak-Khelladi et al., 2010](#_ENREF_5)) | Species numbers from [Kyalangalilwa et al. (2013)](#_ENREF_22), but not counting infraspecific taxa |
| *Arabis alpina* | tropic-alpine | 0.5 |  | 1 | Eurasia | ([Koch et al., 2006](#_ENREF_21)) |  |
| Danthonioidaea | tropic-alpine | 5 |  | 5 | Africa | ([Linder et al., 2013](#_ENREF_24)) | Estimated |
| *Hypericum* (montane radiations) | tropic-alpine | 4.0 (1.7-7.9) | 20 | 20 | Eurasia | ([Meseguer et al., 2013](#_ENREF_27)) | At upper tree limit, almost alpine, numbers estimated |
| *Lobelia* Gaint | tropic-alpine | 11 | 24.5 | 15 | Africa | ([Antonelli, 2009](#_ENREF_1)) | Lobelioideae African in origin, Montane. |
| *Hypericum* (general African) | tropic-montane | 20 |  | 15 | Eurasia | ([Meseguer et al., 2013](#_ENREF_27)) | Montane grassland |
| *Impatiens* | tropic-montane | 5 |  | 109 | Asia | ([Janssens et al., 2009](#_ENREF_19)) | Montane moist forest, it does not get into the Cape |
| *Saintpaulia* | tropic-montane | 21.9 (11.2-34.0) |  | 20 | Africa | ([Moller and Cronk, 1997](#_ENREF_29)) | Embedded in *Streptocarpus*, which is then obviously older. |

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