Supplementary Table 1. List of taxa used from GenBank database.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | ITS | ncpgs | trnL-trnLF | trnSG | trnTL |  |
| *C. albisepta* | UBT:Teissier 24 | AM493299 |  | AM491527/AM491528 | LT904919 | AM491526 | Madagascar:Toliara |
| C. ambovombensis | HEID: Rauh 74872 | AM493300 |  | AM491530/AM491529 | LT904920 | AM491531 | Madagascar:Toliara |
| *C. aristolochioides* | EA:Masinde 684 | LT904973 |  | AM491536/AM491535 | LT904921 | AM491537 | Kenya:Eastern Province |
| *C. pusilla* | Bruyns 5899 | KP244974 | KP245086 | KP245534 | KP245689 | - | India, Tamil Nadu |
| *C. robynsiana* | Pierce 1244 (EA, UBT) | AM493278 |  | AM490385/AM490384 |  | AM490386 | Kenya |
| *C. rupicola* | UBT:Mangelsdorff Y13 | AM493277 |  | AM490388/AM490389 | LT904954 | AM490387 | Yemen:S Manakhah |
| *C. rupicola* | clone 133 | KP244980 | KP245091 | KP245540 | KP245695 | - | Yemen:Nort |
| *C. saxatilis* | Mangelsdorff M21 (UBT) | AJ310786 |  | AJ410041/AJ410042 |  | AJ410040 | Madagascar: Ankarana Mts |
| *C. simoneae* | HEID:Rauh 73113 | AM493275 |  | AM490394/AM490395 | LT904958 | AM490393 | Madagascar:Toliara |
| *C. spiralis* | clone 138 | KP244984 | KP245095 | KP245545 | KP245700 |  | India, Tamil Nadu |
| *C. striata* | Rauh 75007 (HEID, MSUN) | AJ310788 |  | AJ410044/AJ410045 | LT904960 | AJ410043 | Madagascar:Antananarivo, Madagascar: Antsirabe |
| *C. yemenensis* | Mangelsdorff Y24 (B, FR, UBT) | AM493293 |  | AM490400/AM490401 | LT904962 | AM490399 | Yemen:Ussab al 'Ali Massiv |
| *Caralluma sarkariae* | Bruyns 588 | HM475333 | HM475385 | HM164272 | KF677769 |  | India:Tamilnadu |
| *Duvalia angustiloba* | Meve 321 (MSUN) | AJ488792 |  | AJ488367/AJ488368 |  | AJ488366 | South Africa:Beaufort West |
| *Duvaliandra dioscoridis* | Lavranos 1821 (UBT) | AJ488795 | KP245107 | AJ488376/AF214192 | KF677782 | AJ488375 | Yemen:Socotra:Adho Dhemalu |
| *Hoodia gordonii* | Juergens 22837 (MSUN, UBT) | AJ488800 |  | AJ488391/ AJ488392 |  | AJ488390 | South Africa:Pofadde |
| *Orbea halipedicola* | Bruyns 7401 | KF677391 | KF678138 | KF678006 | KF677857 |  | Mozambique |
| *Orbea semota* | Specks 921 | AJ488813 |  | AJ488427/ AJ488428 |  | AJ488426 | Tanzania:Arusha |
| *Pectinaria longipes* var. *longipes* | Bruyns 5985 | KP244996 | KP245104 | KP245560 | KP245715 |  | South Africa, Western Cape |
| *Quaqua incarnata* subsp. *incarnata* | Albers & Meve 06 (MSUN) | AJ488821 |  | AJ488454/ AJ488455 |  | AJ488453 | South Africa:Klawer |
| *Stapelia glanduliflora* | Albers & Meve 04 | AJ402152 |  | AJ402128/ AJ402151 |  | AJ402127 | South Africa:S of Klawer |
| *Stapelia rufa* | Albers 2483 (MSUN) | AJ488825 |  | AJ488466/ AJ488467 |  | AJ488465 | South Africa:Laingsburg |
| *Anisotoma cordifolia* | Nicholas 2811 (UDW | AJ310780 |  | AJ410017/AJ410018 | KF677759 | AJ410016 | South Africa: Eastern Cape |
| *B. angustum* | 004 B40 | KP244853 | KP245001 | KP245414 | KP245566 |  | South Africa, Mpumalanga |
| *B. australe* | 006 B05 | KP244855 | KP245002 | KP245416 | KP245568 |  | South Africa, Kawzulu-Natal |
| *B. burchellii* |  | AJ310789 |  | AJ410047/AJ410048 |  | AJ410046 | South Africa: Free State |
| *B. campanulatum* | 015\_B25 | KP244864 | KP245010 | KP245425 | KP245577 |  | South Africa, Eastern Cape |
| *B. christianeae* | Peckover sub Specks 2531 (UBT) | AJ310796 |  | AJ410071/ AJ410072 |  | AJ410070 | South Africa:Kwa Zulu - Natal |
| *B. christianeae* | 020\_B47 | KP244869 |  | KP245429 | KP245582 |  | South Africa,Kwazulu-Natal |
| *B. ellipticum* | MSUN: Specks 432 | AJ31078 |  | AJ410020/AJ410020 |  | AJ410019 | Ethiopia:Amhara Region |
| *B. filifolium* | 033\_B49 | KP24488 | KP245020 | KP245442 | KP245595 |  | South Africa |
| *B. filifolium* | Peckover sub Specks 2540 (UBT) | AJ310797 |  | AJ410074/ AJ410075 |  | AJ410073 | South Africa:Mpumalanga |
| *B. floribundum* | 034\_B1 | KP244883 | KP245021 | KP245443 | KP245596 |  | Mozambique |
| *B. macropetalum* |  | AJ310782 |  | AJ410026/ AJ410027 | AJ410025 |  | South Africa |
| *B. minimum* | 051\_B89 | KP244899 | KP245035 | KP245460 | KP245613 |  | South Africa, Eastern Cape |
| *B. nanum* |  | AJ310783 |  | AJ410029/ AJ410030 |  | AJ410028 | South Africa |
| *B. petraeum* | UBT: Heiduk et Styles s.n | LT90496 |  | LT905071 |  | LT905042 | South Africa:KwaZulu-Natal |
| *C. abyssinica* | UBT: Specks 1052 | AM493298 |  | AM491524/AM491525 | LT904917 | AM49152 | Tanzania:Singida |
| *B. rubellum* | 066\_B56 | KP244913 | KP245044 | KP245474 | KP245628 |  | South Africa:KwaZulu-Natal |
| *B. rubellum* |  | AJ310798 |  | AJ410077/ AJ410078 | LT904916 | AJ410076 | Tanzania:Moshi |
| *B. tavalla* | 070\_B38 | KP244917 | KP245046 | KP245478 | KP245632 |  | Tanzania |
| *Brachystelma caudatum* | 017\_B9 | KP244866 | KP245012 | KP245427 | KP245579 |  | South Africa, |
| *C. ampliata* | 078\_B97 | KP244925 | KP245052 | KP245485 | KP245640 |  | South Africa, |
| *C. arabica* | IPPS 2852 (UBT) | AM493301 |  | AM491533/ AM491534 |  | AM491532 | Yemen |
| *C. arabica* | 79 | KP244926 | KP245053 | KP245486 | KP245641 |  | Yemen |
| *C. arenaria* | 80 | KP245642 |  | KP245487 | KP245642 |  | South Africa, |
| *C. barbigera* | 84 | KP244931 | KP245055 | KP245491 | KP245646 |  | Ethiopia |
| *C. cimiciodora* | 90 | KP244937 | KP245058 | KP245497 | KP245652 |  | South Africa,Limpopo |
| *C. crassifolia* | ex hort. sub Specks 191 (UBT | AM493303 |  | AM491539/ AM491540 |  | AM491538 | South Africa, Kwazulu-Natal |
| *C. cycniflora* | 93 | KP244940 | KP245060 | KP245500 | KP245655 |  | South Africa, Kwazulu-Natal |
| *C. denticulata* | Masinde et Meve 870 | AM493291 |  | AM491548/ AM491547 | LT904932 | AM491549 | Kenya:Teita Distr. |
| *C. filiformis* | MSUN: Bruyns 6683 | AM493289 |  | AM491554/ AM491553 | LT904936 | AM491555 | South Africa:Northern Cape |
| *C. gilgiana* | E. & M. Specks 1039 | AM493287 |  | AM49156/ AM49160 | LT904938 | AM491561 | Tanzania:Singida |
| *C. linearis* | UBT: ex hort. s.n | AM493292 |  | AM491575/ AM491576 | LT904944 | AM491574 | South Africa, Swaziland, and Zimbabwe |
| *C. meyeri-johannis* | MSUN: Meve 936 | AM49328 |  | AM491584/ AM491583 | LT904948 | AM491585. | Kenya:Mt. Kasigau |
| *C. namaquensis* | 118 | KP244965 | KP245079 | KP245525 | KP245680 |  | South Africa, Northern Cape |
| *C. nilotica* |  | AJ402141 |  | AJ402138/ AJ402141 |  | AJ402117 | Kenya:Mbolo Hills |
| *C. racemosa* | UBT: Juergens et al. 1458 | AM493279 |  | LT905084 | LT904953 | LT905055 | South Africa:KwaZulu-Natal |
| *C. sankuruensis* | MSUN: Meve 908 | AM493276 |  | AM49040/ AM49041 | LT904956 | AM49039 | Cameroon:Southwest Province |
| *C. speciosa* | 137 | KP244983 | KP245094 | KP245544 | KP245699 |  | Tanzania |
| *C. variegata* |  | AM493274 |  | AM490396/ AM490397 |  | AM490398 | Kenya:N Maranal |
| *Chonemorpha fragrans* | multiple sources | MF350534 |  | AB610192 | AY597616 |  | cultivated, collected from Indonesia |
| *Emplectanthus dalzellii* | UBT3443 | LT595672 |  | LT595699 |  | LT595686 | South Africa:KwaZulu-Natal |
| *Hemidesmus indicus* | Civeyrel\_1008 | DQ916851 |  |  |  | DQ916877 | India |
| *Fockea capensis* | Bruyns 7340 (NBG) | KP244995 |  | KP245557 | KP245712 |  | South Africa, Western Cape |
| *Fockea edulis* | Bruyns\_7051 | AM233390 |  | AM233372 |  | AJ431740 | South Africa:Steytlerville |
| *Logania albiflora*/ *Logania vaginalis* | Hubbard 4198 (G) / Bremer 3013 | DQ358879 |  | AJ430910 | HM164272 |  | Australia |
| *Neoschumannia cardinea* | Liede & Meve 3359 (UBT) | AJ310790 |  | AJ410050/ AJ410051 |  | AJ410049 | Tanzania:Lushoto |
| *Neoschumannia kamerunensis* | Meve & Etuge 910 (B, K, UBT) | AJ310791 |  | AJ410053/ AJ410054 |  | AJ410052 | Cameroon:Mt. Cameroon |
| *Riocreuxia burchelli* | ex hort. Shirley s.n | AJ488771 |  | DQ221143/ DQ221185 |  | AY899963. | South Africa:Kwa Zulu - Natal |
| *Sisyranthus compactus* | UDW: Nicholas 2825 | AJ310795 |  | AJ410068/ AJ410069 |  | AJ410067 | South Africa:Eastern Cape |
| *C. dichotoma* | MSUN:Meve s.n. | AM493290 |  | AM491551/ AM491552 | LT904933 | AM491550 | Spain:Canary Island |
| *C. dichotoma* | clone 095 | KP244942 | KP245061 | KP245502 | KP245657 |  | Spain, Canary Islands |
| *C. distincta* | 97 | KP244944 | KP245063 | KP245504 | KP245659 |  | Tanzania |
| *C. distincta* |  | AJ488784 |  | AJ488346/ AJ488347 |  | AJ488345 | Tanzania:Amani |
| *C. foliosa* | 103 B138 | KP244950 | KP245067 | KP245510 | KP245665 |  | Yemen |
| *C. foliosa* | Mangelsdorff Y23 (UBT) | AM493288. |  | AM491557/ AM491558 | LT904937 | AM491556 | Yemen:Nort |
| *C. fusiformis* | 104 K16 Bruyns 12617 (BOL) | KP244951 | KP245068 | KP24551 | KP245666 |  | West tropical Africa - Ghana to Nigeria. |
| *C. hirsuta* | Bruyns 11433 (E) | KP244952 | KP245069 |  | KP245512 | KP245667 | India, Maharashtra |
| *C. humbertii* | Mangelsdorff M22 (MSUN) | AM493286 |  | AM491563/ AM49154 | LT904940 | AM491562 | Madagascar:Antsiranana |
| *C. konasita* | UBT: Masinde et Meve 854 | AM493284 |  | AM491569/ AM491570 | LT904943 | AM49156 | Kenya:Taita |
| *C. monticola* | UBT: Schnidt et Frazer 96-145 | AM493306 |  | AM490376/ AM490377 | LT904949 | AM491586 | China:Yunnan-Lunan |
| *C. decaisneana* | 094\_B117 Bruyns 11473 (BOL) | KP244794 | KP244941 | KP245656 | KP245199 |  | India, Tamil Nadu |
| *B. kolarense* | clone 044 Bruyns 11463 (E) | KP244892 | KP245028 | KP245453 | KP245606 |  | India, Karnataka |
| *C. dimorpha* | Bruyns\_6212 | KF677314 | KF678072 | KF677929 | KF677771 |  | Madagascar |
| *C. cumingiana* | Liede 3250 (ULM, UBT) | AM493294 | - | AM491545/ AM491546 | LT904930 | AM491544 | Philippines:Luzon; Laguna Prov. |
| *B. edule* | 031\_B135 Bruyns 11431 (E) | KP244880 | - | KP245440 | KP245593 |  | India, Maharashtra |
| *B. edule* | 068\_B104 Bruyns 8813 (BOL) | KP244915 | KP245045 | KP245476 | KP245630 |  | Myanmar |
| *B. edule* (*B. shrirangi*i) | Kamble 2164 | EU106702 | - | EU120013/EU127982 |  | EU106731 EU120 | India, Maharashtra, Kolhapur, Satara |
| *C. pubescens* | Gerl 637 (UBT) | AM493280 |  | AM490379/AM490378 |  | AM490380 | Nepal:Anapurna, Komrong Hill |
| *C. bulbosa* | 147\_B142 Bruyns 11557 (S) | KP244993 | KP245103 | KP245554 | KP245709 |  | Ethiopia |
| *C. botrys* | clone 085 Bruyns 10231 (E) | KP244932 | KP245056 | KP245492 | KP245647 |  | Yemen |
| *B. tenuissimum* | 72 Bruyns 9641 (BOL) | KP245480 | KP245634 | KP244919 | KP245048 |  | Tanzania |
| *B. brevitubulatum* | 12 Bruyns 11469 (BOL) | KP244861 | KP245007 | KP245422 | KP245574 |  | India, Tamil Nadu |
| *C. ballyana* | 82 Bruyns 12497 (BOL, EA) | KP244929 |  | KP245489 | KP245644 |  | Kenya |
| *Schizostephanus gossweileri* | clone 155 (S. Moore) Liede | KP244998 | KP245106 | KP245562 | KP245717 |  | Angola |
| *C. evansii* | Kamble 2128 | EU106680 |  | EU120003/ EU127975 |  | EU106721 | India, Maharashtra |
| *C. leroyi* | 110 Bruyns 6222 (BOL) | KP244957 | KP245072 | KP245517 | KP245672 |  | Madagascar |
| *C. longifolia* | Liede 3280 (UBT) | AM493283 |  | AM491572/ AM491571 |  | AM491573 | Bhutan:Wangduephodrang |
| *C. lugardiae* | clone 113 Bruyns 10445 (E) | KP244960 | KP245075 | KP245520 | KP245675 |  | Angola |
| *C. succulenta* | 143 Bruyns 12498 (BOL, EA) | KP244989 | KP245100 | KP245550 | KP245705 |  | Kenya |
| *C. verruculosa* | 146 Bruyns (BOL) | KP244992 | KP245102 | KP245553 | KP245708 |  | South Africa |

Supplementary Table 2. List of outgroup taxa used for this study, their localities, voucher information and accession numbers.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample ID | Species name | Locality | ITS | *trnTL* | *trnL-LF* | *trnSG* | ncpGS |
| C53 | *Leptadenia pyrotechnica* | Rajasthan | MT056111 | MT070832 | MT078000 |  |  |
| 07 | *Secamone emetica* | Maharashtra |  | MT070851 | MT078024 | MT078107 |  |
| U3 | *Decalepis hamiltonii* | Karnataka |  |  |  | MT078112 | MT077954 |
| 26 | *Oxystelma esculentum* | Maharashtra |  | MT070855 | MT078028 | MT078110 | MT077953 |
| 21 | *Cosmostigma racemosum* | Maharashtra |  | MT070854 | MT078027 | MT078109 | MT077952 |
| 15 | *Graphistemma pictum* | Hong Kong |  | MT070853 | MT078026 | MT078108 | MT077951 |
| 12 | *Hoya wightii* | Maharashtra |  | MT070852 | MT078025 |  |  |
| 5 | *Dregea volubilis* | Maharashtra |  | MT070850 | MT078023 | MT078106 | MT077950 |
| 4 | *Seshagiria sahyadrica* | Cultivated, Bangalore, India Maharashtra |  | MT070849 | MT078022 | MT078105 | MT077949 |
| C52 | *Heterostemma sp* | Sri Lanka | MT056110 | MT070831 | MT077999 |  | MT077931 |
| Ou10 | *Allamanda cathartica* | Cultivated, Bangalore, India | ABXXXXX | MT070861 | MT078032 | MT078116 |  |
| Ou2 | *Alyxia sinensis* | Lamma Island, Hong Kong |  | MT070858 | MT078029 | MT078113 | MT077955 |
| Ou17 | *Carissa* sps. | Cultivated, Bangalore, India |  |  | MT078036 | MT078119 |  |
| U3 | *Decalepis hamiltonii* | FRLHT, Bangalore, India |  | MT070857 |  |  |  |
| Ou19 | *Ervatamia heyneanum* | Cultivated, Bangalore, India |  | MT070864 | MT078038 | MT078121 |  |
| Ou15 | *Holorrhena antidysentriaca* | Nandi hills, Bangalore, India |  |  | MT078034 |  |  |
| Ou9 | *Nerium oleander* | Cultivated, Bangalore, India |  | MT070860 | MT078031 | MT078115 |  |
| Ou7 | *Plumeria alba* | Cultivated, Bangalore, India |  | MT070859 | MT078030 | MT078114 |  |
| Ou11 | *Thevetia neriifolia* | Cultivated, Bangalore, India |  | MT070862 | MT078033 | MT078117 |  |
| U1 | *Utleria* sps | FRLHT, Bangalore India |  | MT070856 | MT078111 |  |  |
| Ou18 | *Carthanthus roseus* | Cultivated, Bangalore, India |  | MT070863 | MT078037 | MT078120 |  |
| Ou16 | *Wrightia tomentosa* | Nandi hills, Bangalore,  India |  |  | MT078035 | MT078118 |  |

Supplementary Table 3. Sequence length of individual gene regions, combined dataset, parsimoniously informative variable sites, best fit model of sequence evolution in Bayesian phylogenetic and relaxed molecular clock dating analyses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Gene name | No. of taxa in each data | Length | PIC | Non-PIC | Constant | Best-fit model of sequence evolution |
| MrBayes analysis (smaller dataset) | | | | | | |
| ITS | 156 | 718 | 294 | 83 | 344 | GTR+I+G |
| *nCPGS* | 91 | 940 | 149 | 142 | 650 | HKY+G |
| *trnL-trnLF* | 155 | 926 | 81 | 67 | 778 | GTR+G |
| *trnSG* | 106 | 577 | 46 | 38 | 493 | HKY+G |
| *trnTL* | 106 | 839 | 53 | 71 | 715 | GTR+G |
| Combined | 158 | 4000 | 623 | 401 | 2972 | GTR+I+G |
| BEAST molecular dating (large dataset) | | | | | | |
| ITS | 182 | 893 | 463 | 140 | 293 | GTR+I+G |
| nCPGS | 113 | 1051 | 334 | 255 | 465 | GTR+I+G |
| *trnL-trnLF* | 186 | 1092 | 175 | 212 | 705 | GTR+G |
| *trnSG* | 138 | 715 | 180 | 141 | 396 | GTR+G |
| *trnTL* | 129 | 972 | 182 | 201 | 589 | GTR+G |
| Combined | 191 | 4723 | 1338 | 951 | 2434 | GTR+I+G |