

**Table S1.** The main pollinators of individual plant species and their visitation frequencies.

| Plant species                     | Plant family   | Pollinator group | Visitation frequency<br>(flower <sup>-1</sup> ,hr <sup>-1</sup> ) | The proportion of visits<br>by the main pollinator<br>group (%) |
|-----------------------------------|----------------|------------------|---|---|
| <i>Acanthonema strigosum</i>      | Gesneriaceae   | Bee              | 0.0676  | 70.9  |
| <i>Acanthopale decempedalis</i>   | Acanthaceae    | Hoverfly         | 0.0306  | 100   |
| <i>Aframomum sp purple</i>        | Zingiberaceae  | Butterfly        | 0.1778  | 57.7  |
| <i>Argocoffeopsis afzelii</i>     | Rubiaceae      | Bee              | 0.0149  | 46.2  |
| <i>Baccharoides calvoana</i>      | Compositae     | Bee              | 0.3773  | 81.1  |
| <i>Bertiera racemosa</i>          | Rubiaceae      | Bee              | 1.0633  | 99.4  |
| <i>Brillantaisia owariensis</i>   | Acanthaceae    | Bee              | 0.1019  | 95.7  |
| <i>Calochone acuminata</i>        | Rubiaceae      | Butterfly        | 0.1211  | 100   |
| <i>Chlorophytum comosum</i>       | Asparagaceae   | Hoverfly         | 0.1617  | 100   |
| <i>Clematis simensis</i>          | Ranunculaceae  | Moth             | 0.0647  | 59.5  |
| <i>Clerodendrum silvanum</i>      | Lamiaceae      | Moth             | 0.0581  | 64.8  |
| <i>Costus dubius</i>              | Costaceae      | Passeriformes    | 0.0915  | 75  |
| <i>Crassocephalum montuosum</i>   | Compositae     | Bee              | 0.3074  | 44.5  |
| <i>Cuviera longiflora</i>         | Rubiaceae      | Passeriformes    | 0.0293  | 66.5  |
| <i>Deinbollia sp 1</i>            | Sapindaceae    | Moth             | 0.0988  | 55.6  |
| <i>Dicranolepis vestita</i>       | Thymelaeaceae  | Hoverfly         | 0.0207  | 42.9  |
| <i>Dioscoreophyllum cumminsii</i> | Menispermaceae | Moth             | 0.0528  | 100   |
| <i>Dischistocalyx strobilinus</i> | Acanthaceae    | Bee              | 0.5958  | 56.4  |
| <i>Disoclaoxylon hexandrum</i>    | Euphorbiaceae  | Bee              | 0.0193  | 47.9  |
| <i>Discopodium penninervium</i>   | Solanaceae     | Hoverfly         | 0.2074  | 80  |
| <i>Distephanus biafrae</i>        | Compositae     | Bee              | 0.0913  | 38  |
| <i>Gomphia flava</i>              | Ochnaceae      | Bee              | 0.0302  | 85.1  |
| <i>Heckeldora staudtii</i>        | Meliaceae      | Moth             | 0.0543  | 100   |
| <i>Heinsia crinita</i>            | Rubiaceae      | Butterfly        | 0.0447  | 66.7  |
| <i>Hypoestes triflora</i>         | Acanthaceae    | Hoverfly         | 0.0557  | 37.2  |
| <i>Ilex mitis</i>                 | Aquifoliaceae  | Bee              | 0.1940  | 82.9  |
| <i>Impatiens burtonii</i>         | Balsaminaceae  | Hoverfly         | 0.3521  | 79.6  |
| <i>Impatiens frithii</i>          | Balsaminaceae  | Passeriformes    | 0.0062  | 100   |
| <i>Impatiens hians</i>            | Balsaminaceae  | Passeriformes    | 0.0304  | 100   |
| <i>Impatiens macroptera</i>       | Balsaminaceae  | Bee              | 0.6715  | 66.6  |
| <i>Impatiens mannii</i>           | Balsaminaceae  | Hoverfly         | 0.6804  | 86.7  |
| <i>Impatiens niamniamensis</i>    | Balsaminaceae  | Passeriformes    | 0.0384  | 53.5  |
| <i>Impatiens sakeriana</i>        | Balsaminaceae  | Passeriformes    | 0.0702  | 100   |
| <i>Isodon ramosissimus</i>        | Lamiaceae      | Bee              | 0.1475  | 83.3  |
| <i>Isoglossa glandulifera</i>     | Acanthaceae    | Hoverfly         | 0.1274  | 97.9  |
| <i>Ixora foliosa</i>              | Rubiaceae      | Bee              | 0.0065  | 43.1  |
| <i>Ixora guineensis</i>           | Rubiaceae      | Moth             | 0.2621  | 71.6  |
| <i>Laccodiscus ferrugineus</i>    | Sapindaceae    | Bee              | 0.0919  | 88.6  |
| <i>Melanthera scandens</i>        | Compositae     | Butterfly        | 0.1374  | 55.2  |
| <i>Mikania cordata</i>            | Compositae     | Butterfly        | 0.0053  | 66.7  |
| <i>Nuxia congesta</i>             | Stilbaceae     | Bee              | 0.1085  | 88.6  |
| <i>Oncoba dentata</i>             | Salicaceae     | Bee              | 0.0845  | 100   |
| <i>Pavetta hookeriana</i>         | Rubiaceae      | Bee              | 0.2768  | 82.6  |
| <i>Pavetta neurocarpa</i>         | Rubiaceae      | Bee              | 0.0111  | 73.3  |
| <i>Pavetta rigida</i>             | Rubiaceae      | Butterfly        | 0.0024  | 93.3  |
| <i>Plectranthus decurrens</i>     | Lamiaceae      | Bee              | 0.5710  | 98.6  |
| <i>Plectranthus glandulosus</i>   | Lamiaceae      | Bee              | 0.0910  | 65.7  |

|                                    |                 |               |        |      |
|------------------------------------|-----------------|---------------|--------|------|
| <i>Plectranthus kamerunensis</i>   | Lamiaceae       | Hoverfly      | 0.1521 | 53.1 |
| <i>Psychotria bifaria</i>          | Rubiaceae       | Bee           | 0.2458 | 84.7 |
| <i>Psychotria leptophylla</i>      | Rubiaceae       | Bee           | 0.1673 | 44   |
| <i>Psychotria peduncularis</i>     | Rubiaceae       | Passeriformes | 0.2263 | 73.9 |
| <i>Psychotria thonneri</i>         | Rubiaceae       | Bee           | 0.4177 | 67.6 |
| <i>Psydrax dunlapii</i>            | Rubiaceae       | Bee           | 0.3555 | 69.3 |
| <i>Sabicea calycina</i>            | Rubiaceae       | Bee           | 0.3729 | 96.7 |
| <i>Sabicea pilosa</i>              | Rubiaceae       | Passeriformes | 0.1553 | 90.9 |
| <i>Schefflera abyssinica</i>       | Araliaceae      | Bee           | 0.8157 | 95.7 |
| <i>Solanecio mannii</i>            | Compositae      | Moth          | 0.0116 | 95   |
| <i>Spermacoce princeae</i>         | Rubiaceae       | Hoverfly      | 0.0805 | 70.1 |
| <i>Stachys aculeolata</i>          | Lamiaceae       | Bee           | 0.2318 | 71.2 |
| <i>Stellaria mannii</i>            | Caryophyllaceae | Hoverfly      | 0.0255 | 85.7 |
| <i>Tabernaemontana brachyantha</i> | Apocynaceae     | Moth          | 0.0303 | 40.1 |
| <i>Tabernaemontana ventricosa</i>  | Apocynaceae     | Butterfly     | 0.0543 | 23.4 |
| <i>Thunbergia fasciculata</i>      | Acanthaceae     | Bee           | 0.4088 | 70   |
| <i>Trichilia rubescens</i>         | Meliaceae       | Bee           | 0.0869 | 30.8 |
| <i>Voacanga africana</i>           | Apocynaceae     | Bee           | 0.1457 | 46.1 |
| <i>Voacanga bracteata</i>          | Apocynaceae     | Moth          | 0.0915 | 100  |

**Table S2.** The replacement of some species missing in ALLMB Spermatophyta tree (Smith and Brown 2018) by relatives. The checklist of plants included in this study “Species” and plants used in the phylogeny tree “Phylogenetical tree species”. Substitutes are indicated by phylogenetic tree species names in bold.

| Species                           | Phylogenetical tree species              | family         |
|-----------------------------------|--|----------------|
| <i>Acanthonema strigosum</i>      | <b><i>Saintpaulia inconspicua</i></b>    | Gesneriaceae   |
| <i>Acanthopale decempedalis</i>   | <i>Acanthopale decempedalis</i>          | Acanthaceae    |
| <i>Aframomum</i> sp purple        | <b><i>Aframomum luteoalbum</i></b>       | Zingiberaceae  |
| <i>Argocoffeopsis afzelii</i>     | <b><i>Calycosiphonia spathicalyx</i></b> | Rubiaceae      |
| <i>Baccharoides calvoana</i>      | <b><i>Baccharoides lasiopus</i></b>      | Asteraceae     |
| <i>Bertiera racemosa</i>          | <i>Bertiera racemosa</i>                 | Rubiaceae      |
| <i>Brillantaisia owariensis</i>   | <b><i>Brillantaisia vogeliana</i></b>    | Acanthaceae    |
| <i>Calochone acuminata</i>        | <i>Calochone acuminata</i>               | Rubiaceae      |
| <i>Chlorophytum comosum</i>       | <i>Chlorophytum comosum</i>              | Asparagaceae   |
| <i>Clematis simensis</i>          | <i>Clematis simensis</i>                 | Ranunculaceae  |
| <i>Clerodendrum silvanum</i>      | <i>Clerodendrum silvanum</i>             | Lamiaceae      |
| <i>Costus dubius</i>              | <i>Costus dubius</i>                     | Costaceae      |
| <i>Crassocephalum montuosum</i>   | <i>Crassocephalum montuosum</i>          | Asteraceae     |
| <i>Cuviera longiflora</i>         | <i>Cuviera longiflora</i>                | Rubiaceae      |
| <i>Deinbollia</i> sp 1            | <b><i>Deinbollia macrocarpa</i></b>      | Sapindaceae    |
| <i>Dicranolepis vestita</i>       | <i>Dicranolepis vestita</i>              | Thymelaeaceae  |
| <i>Dioscoreophyllum cumminsii</i> | <i>Dioscoreophyllum cumminsii</i>        | Menispermaceae |
| <i>Dischistocalyx strobilinus</i> | <i>Dischistocalyx strobilinus</i>        | Acanthaceae    |
| <i>Discoclaoxylon hexandrum</i>   | <i>Discoclaoxylon hexandrum</i>          | Euphorbiaceae  |
| <i>Discopodium penninervium</i>   | <i>Discopodium penninervium</i>          | Solanaceae     |
| <i>Distephanus biafrae</i>        | <b><i>Distephanus barus</i></b>          | Asteraceae     |
| <i>Gomphia flava</i>              | <b><i>Gomphia densiflora</i></b>         | Ochnaceae      |
| <i>Heckeldora staudtii</i>        | <i>Heckeldora staudtii</i>               | Meliaceae      |
| <i>Heinsia crinita</i>            | <i>Heinsia crinita</i>                   | Rubiaceae      |
| <i>Hypoestes triflora</i>         | <i>Hypoestes triflora</i>                | Acanthaceae    |
| <i>Ilex mitis</i>                 | <i>Ilex mitis</i>                        | Aquifoliaceae  |

|  |  |                 |
|--|--|-----------------|
| <i>Impatiens burtonii</i> subsp. <i>burtonii</i> | <i>Impatiens burtonii</i> subsp. <i>burtonii</i> | Balsaminaceae   |
| <i>Impatiens frithii</i>                         | <i>Impatiens frithii</i>                         | Balsaminaceae   |
| <i>Impatiens hians</i>                           | <i>Impatiens hians</i>                           | Balsaminaceae   |
| <i>Impatiens macroptera</i>                      | <i>Impatiens macroptera</i>                      | Balsaminaceae   |
| <i>Impatiens mannii</i>                          | <i>Impatiens mannii</i>                          | Balsaminaceae   |
| <i>Impatiens niamniamensis</i>                   | <i>Impatiens niamniamensis</i>                   | Balsaminaceae   |
| <i>Impatiens sakeriana</i>                       | <i>Impatiens sakeriana</i>                       | Balsaminaceae   |
| <i>Isodon ramosissimus</i>                       | <i>Isodon ramosissimus</i>                       | Lamiaceae       |
| <i>Isoglossa glandulifera</i>                    | <i>Isoglossa glandulifera</i>                    | Acanthaceae     |
| <i>Ixora foliosa</i>                             | <i>Ixora foliosa</i>                             | Rubiaceae       |
| <i>Ixora guineensis</i>                          | <i>Ixora guineensis</i>                          | Rubiaceae       |
| <i>Laccodiscus ferrugineus</i>                   | <i>Laccodiscus ferrugineus</i>                   | Sapindaceae     |
| <i>Melanthera scandens</i>                       | <b><i>Melanthera remyi</i></b>                   | Asteraceae      |
| <i>Mikania cordata</i>                           | <i>Mikania cordata</i>                           | Asteraceae      |
| <i>Nuxia congesta</i>                            | <i>Nuxia congesta</i>                            | Stilbaceae      |
| <i>Oncoba dentata</i>                            | <b><i>Oncoba spinosa</i></b>                     | Salicaceae      |
| <i>Pavetta hookeriana</i>                        | <i>Pavetta hookeriana</i>                        | Rubiaceae       |
| <i>Pavetta neurocarpa</i>                        | <i>Pavetta neurocarpa</i>                        | Rubiaceae       |
| <i>Pavetta rigida</i>                            | <i>Pavetta rigida</i>                            | Rubiaceae       |
| <i>Plectranthus decurrens</i>                    | <i>Plectranthus decurrens</i>                    | Lamiaceae       |
| <i>Plectranthus glandulosus</i>                  | <i>Plectranthus glandulosus</i>                  | Lamiaceae       |
| <i>Plectranthus kamerunensis</i>                 | <i>Plectranthus kamerunensis</i>                 | Lamiaceae       |
| <i>Psychotria bifaria</i>                        | <i>Psychotria bifaria</i>                        | Rubiaceae       |
| <i>Psychotria leptophylla</i>                    | <i>Psychotria leptophylla</i>                    | Rubiaceae       |
| <i>Psychotria peduncularis</i>                   | <i>Psychotria peduncularis</i>                   | Rubiaceae       |
| <i>Psychotria thonneri</i>                       | <b><i>Psychotria ledermannii</i></b>             | Rubiaceae       |
| <i>Psydrax dunlapii</i>                          | <i>Psydrax dunlapii</i>                          | Rubiaceae       |
| <i>Sabicea calycina</i>                          | <i>Sabicea calycina</i>                          | Rubiaceae       |
| <i>Sabicea pilosa</i>                            | <i>Sabicea pilosa</i>                            | Rubiaceae       |
| <i>Schefflera abyssinica</i>                     | <i>Schefflera abyssinica</i>                     | Araliaceae      |
| <i>Solanecio mannii</i>                          | <i>Solanecio mannii</i>                          | Asteraceae      |
| <i>Spermacoce princeae</i>                       | <i>Spermacoce princeae</i>                       | Rubiaceae       |
| <i>Stachys aculeolata</i>                        | <i>Stachys aculeolata</i>                        | Lamiaceae       |
| <i>Stellaria mannii</i>                          | <i>Stellaria mannii</i>                          | Caryophyllaceae |
| <i>Tabernaemontana brachyantha</i>               | <i>Tabernaemontana brachyantha</i>               | Apocynaceae     |
| <i>Tabernaemontana ventricosa</i>                | <i>Tabernaemontana ventricosa</i>                | Apocynaceae     |
| <i>Thunbergia fasciculata</i>                    | <i>Thunbergia fasciculata</i>                    | Acanthaceae     |
| <i>Trichilia rubescens</i>                       | <i>Trichilia rubescens</i>                       | Meliaceae       |
| <i>Voacanga africana</i>                         | <i>Voacanga africana</i>                         | Apocynaceae     |
| <i>Voacanga bracteata</i>                        | <i>Voacanga bracteata</i>                        | Apocynaceae     |

**Table S3.** Parameters of models for individual nectar traits with the best fits (see Table 3).  $\sigma^2$ -random drift;  $\alpha$  – strength of selection;  $\theta_{\text{BIRDS}}$  – adaptive peak for birds;  $\theta_{\text{INSECTS}}$  – adaptive peak for insects.

|                           | Sucrose<br>pro.      | Glucose<br>pro.      | Fructose pro.        | Suc/Hex<br>ratio     | Total<br>amount      | Sucrose<br>amount    | Glucose<br>amount | Fructose<br>amount |
|---------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|--------------------|
| best-fitting<br>model     | OU-PG <sub>(2)</sub> | OU-PG <sub>(2)</sub> | OU-PG <sub>(2)</sub> | OU-PG <sub>(2)</sub> | OU-PG <sub>(2)</sub> | OU-PG <sub>(2)</sub> | OU1               | OU1                |
| $\sigma^2$                | 0.014                | 0.086                | 0.129                | 10.333               | 6.922                | 0.140                | 0.068             | 0.243              |
| $\alpha$                  | 0.106                | 2.614                | 2.614                | 0.267                | 2.613                | 0.406                | 1.167             | 0.238              |
| $\theta_{\text{BIRDS}}$   | 0.857                | 0.100                | 0.127                | 6.500                | 1.807                | 1.609                | ---               | ---                |
| $\theta_{\text{INSECTS}}$ | 0.500                | 0.237                | 0.250                | 2.604                | 0.499                | 0.213                | ---               | ---                |

