



The Gap between Specimen and Species

—Herbaria source of new plant species—

Presenter: Chang Longxiao

07/01/2025

On the reporting of new species

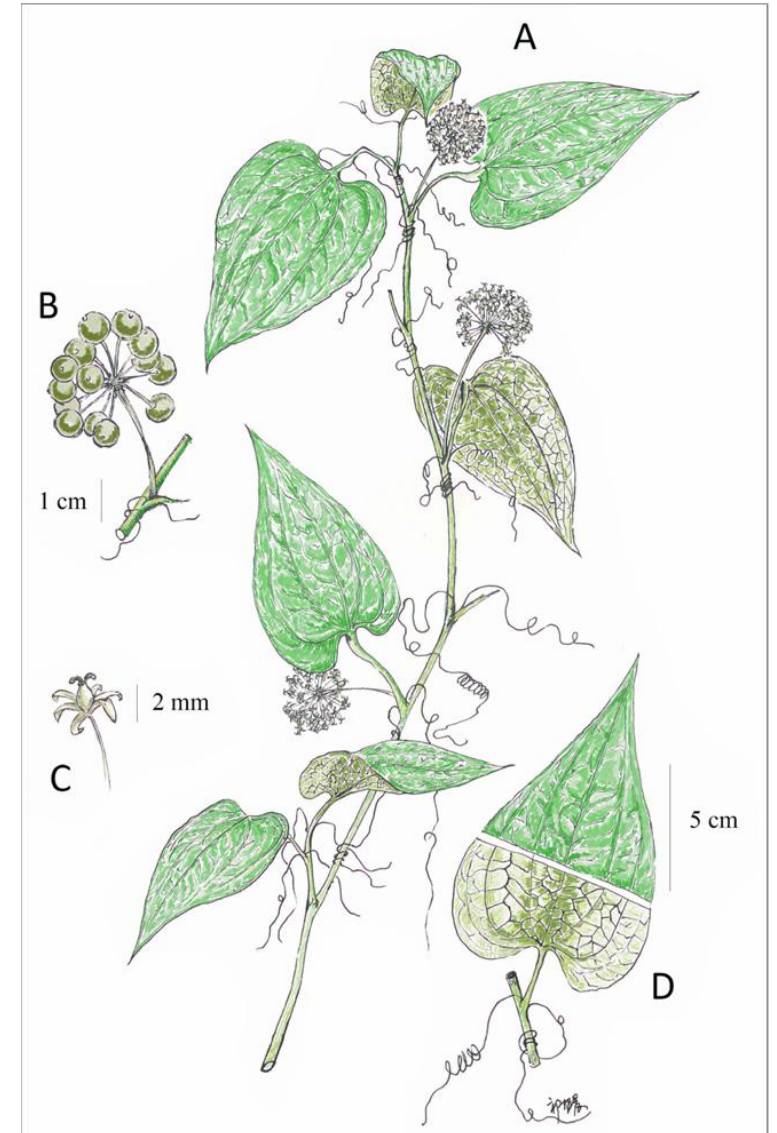
An interesting story on my first botany course

The process of reporting new species

The gap between specimen and species

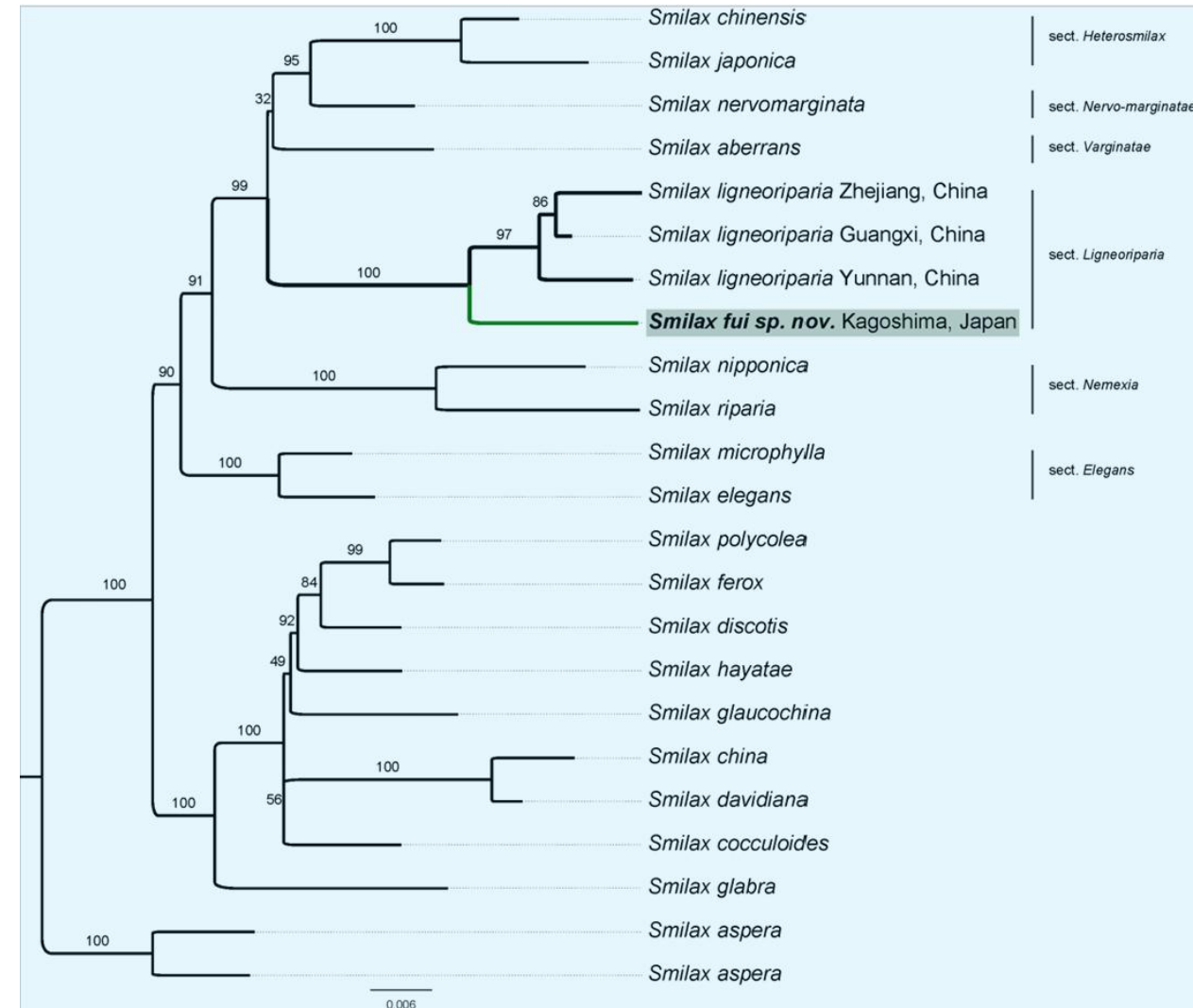
Smilax fui: a species from Herbaria

- During a research in the herbarium of the Osaka Museum of Natural History (OSA)
- some specimens of *Smilax* from southern islands of Kagoshima prefecture, Japan

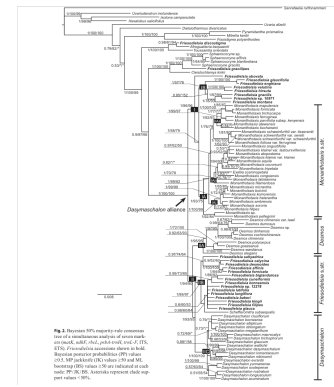
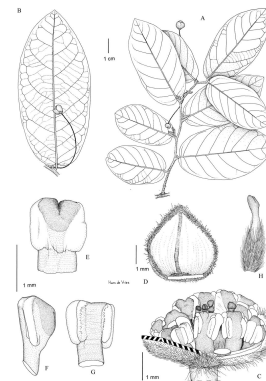
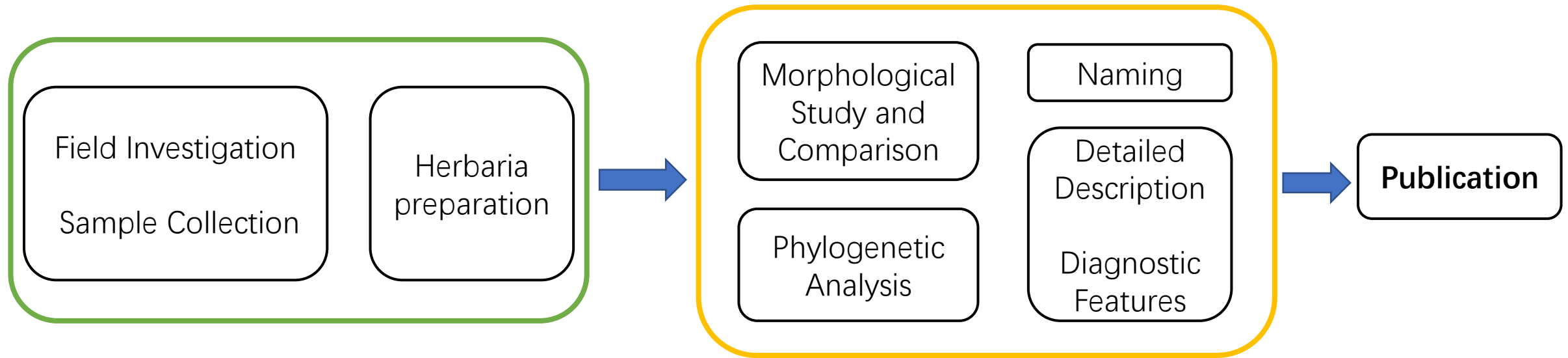


Smilax fui: a species from Herbaria

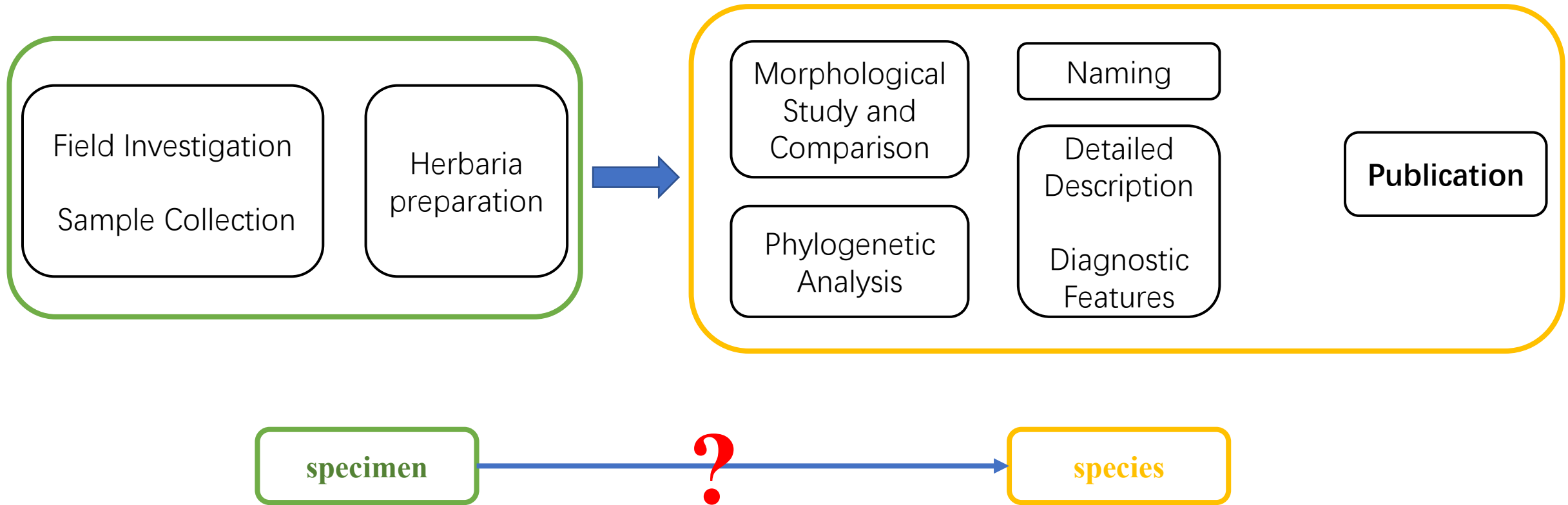
- very similar vegetative characters to the species of *sect. Heterosmilax*
- but have free tepals which are regularly seen in other *Smilax* species.



Reporting new species



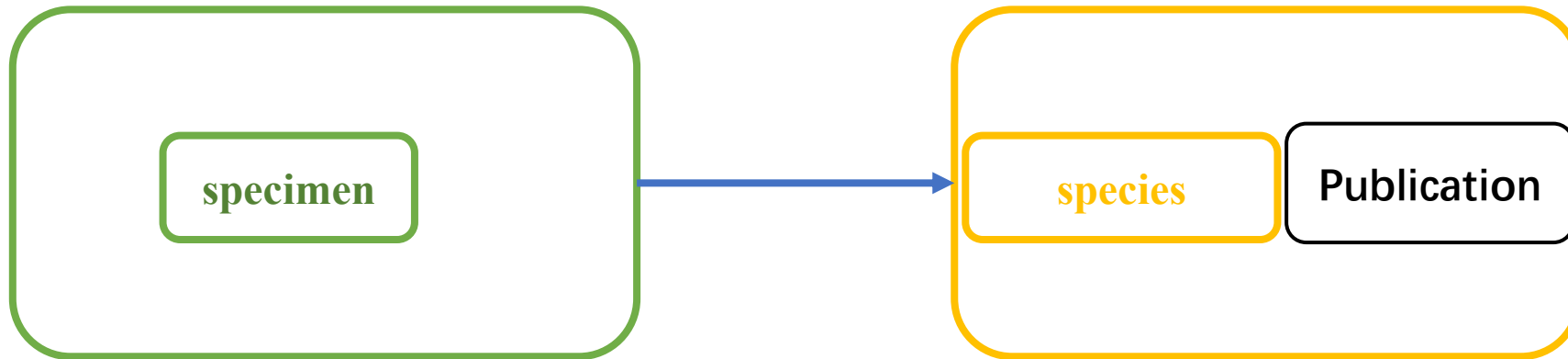
Reporting new species



Herbaria:
a major frontier for
species discovery

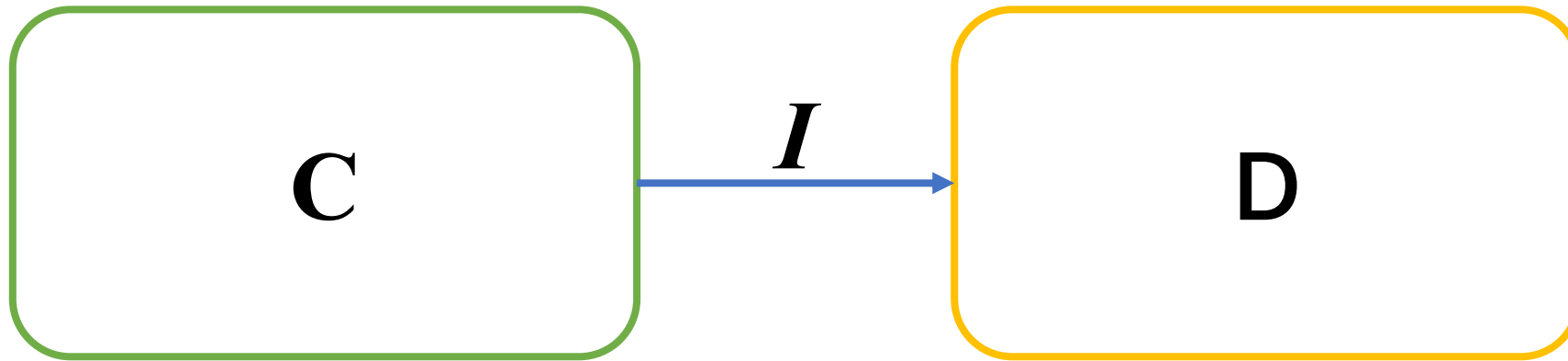
Species Discovery

the lag between the collection of flowering plant specimens and their subsequent recognition and description as new species



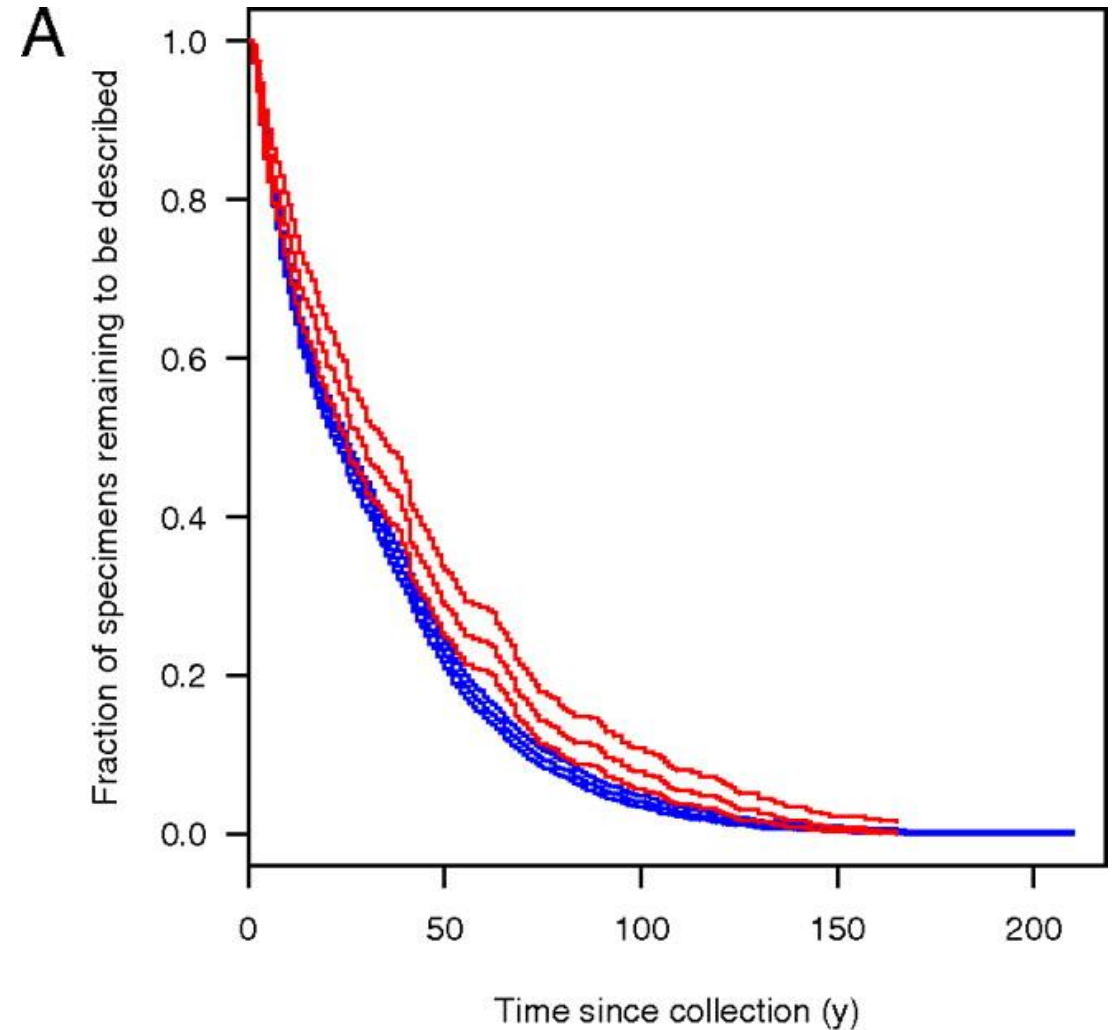
The temporal dynamics

For a representative dataset, **the discovery time (I)** between the date of **the earliest specimen collected (C)** and date the description was **published (D)** was calculated for each species



The temporal dynamics

- Discovery I ranged from 1 to 210 y, averaging 38.8 y for monographs and 32.4 y for Kew Bulletin.
- Median (the time taken to describe half the specimens collected in a particular year) was 22–25 y (95% confidence interval) for Kew Bulletin and 25–34 y for monographs.



Significant numbers of undescribed species have already been collected and are housed in herbaria, awaiting detection and description.

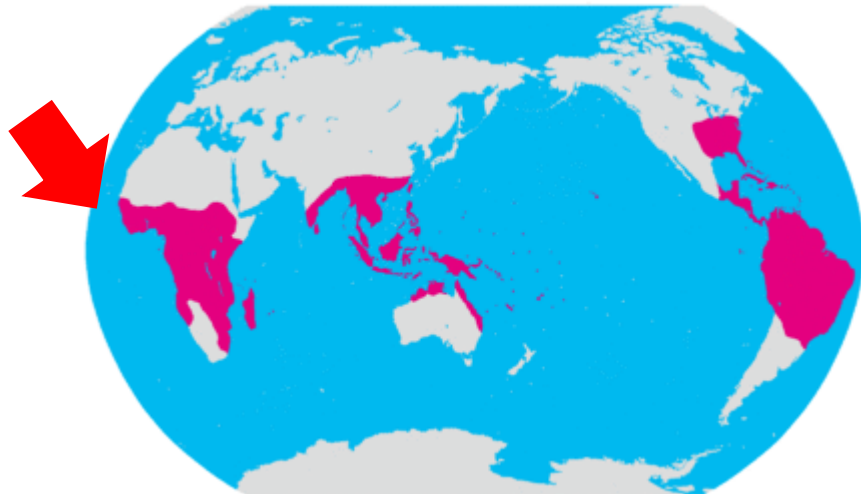
- Current estimates: $\approx 20\%$ of species of flowering plant remain undescribed ($\approx 70,000$ species)
- an approximate annual description rate :all flowering plants should be described within 35 y, i.e., by 2045.
- the model predicts:
- a large fraction of those unknown species are already in the collections

(47–59% under a Kew Bulletin description rate, and 53–66% for a monographic approach)

Case study:
an ongoing revision of
Monanthotaxis Baill. (*Annonaceae*)

The genus *Monanthotaxis* Baill.

- The genus *Monanthotaxis* Baill. belongs to the tribe *Uvariae* in the family *Annonaceae* (Chatrou et al. 2012).

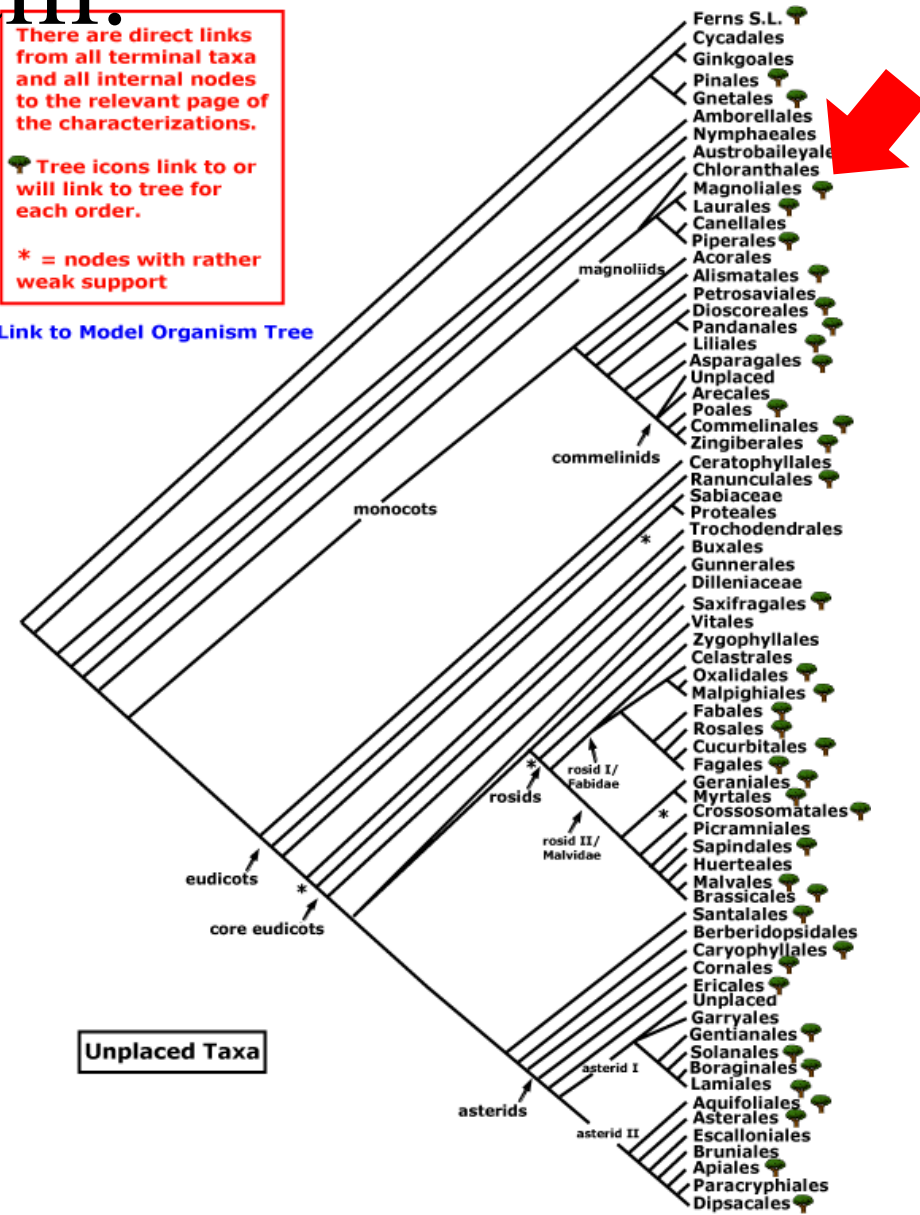


There are direct links from all terminal taxa and all internal nodes to the relevant page of the characterizations.

Tree icons link to or will link to tree for each order.

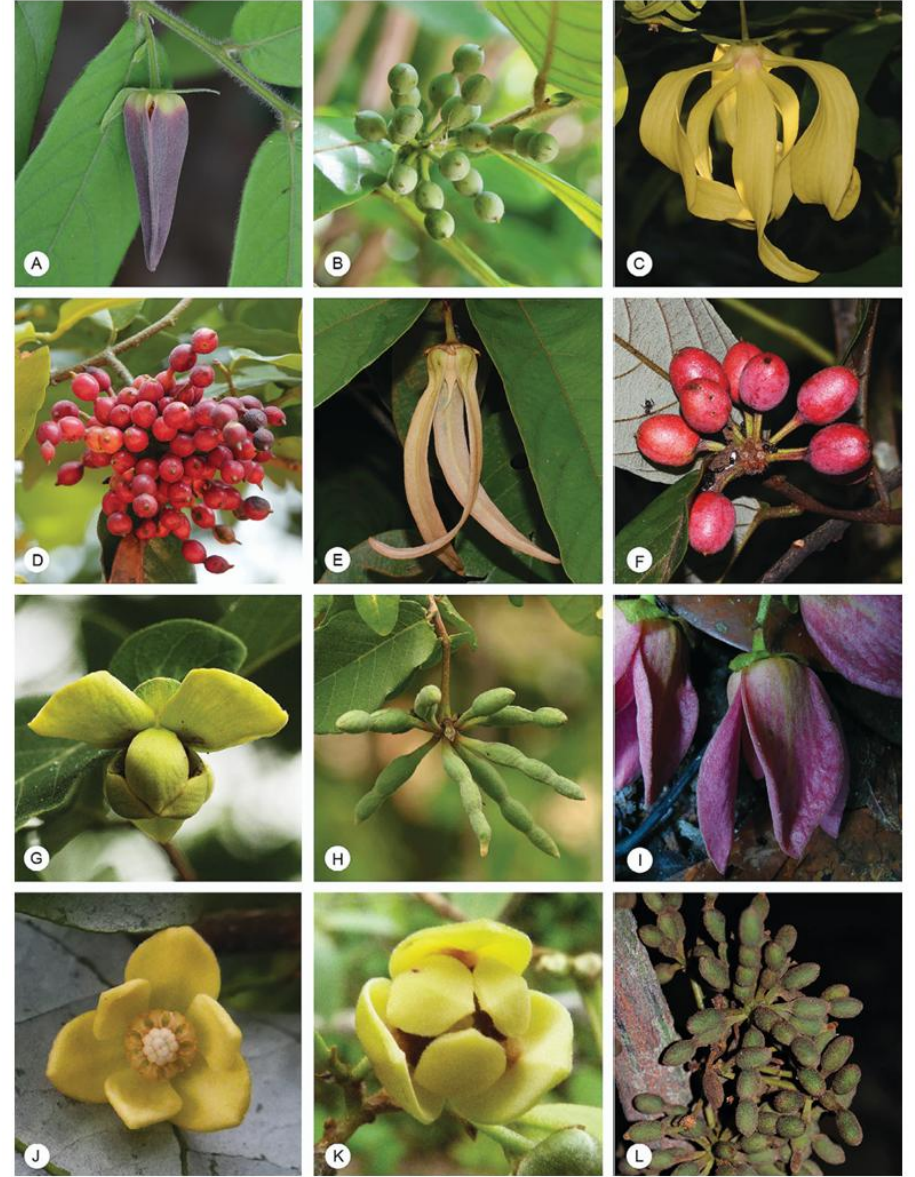
* = nodes with rather weak support

[Link to Model Organism Tree](#)



The genus *Monanthotaxis* Baill.

- Species of *Monanthotaxis* are scandent shrubs or lianas, and are confined to tropical Africa and Madagascar.



Guo, X., P. H. Hoekstra, C. C. Tang, D. C. Thomas, J. J. Wieringa, L. W. Chatrou, and R. M. K. Saunders. 2017. Cutting up the climbers: Evidence for extensive polyphyly in *Friesodielsia* (Annonaceae) necessitates generic realignment across the tribe Uvarieae. *TAXON* 66:3–19.

The genus *Monanthotaxis* Baill.

- *Monanthotaxis* : in Greek
- **μόνος** (*mónos*, meaning "single")
- **ἄνθος** (*ánthos*, meaning "flower")
- **τάξις** (*táxis*, meaning "arrangement, order")



Species: *Monanthotaxis schweinfurthii* (Engl. & Diels) Verdc.
Photographer: Warren McClelland

A taxonomic revision of the genus

PhytoKeys 69: 71–103 (2016)
doi: 10.3897/phytokeys.69.9292
<http://phytokeys.pensoft.net>

RESEARCH ARTICLE



A nonet of novel species of *Monanthotaxis* (Annonaceae) from around Africa

Paul H. Hoekstra^{1,2}, Jan J. Wieringa^{1,2}, Lars W. Chatrou²

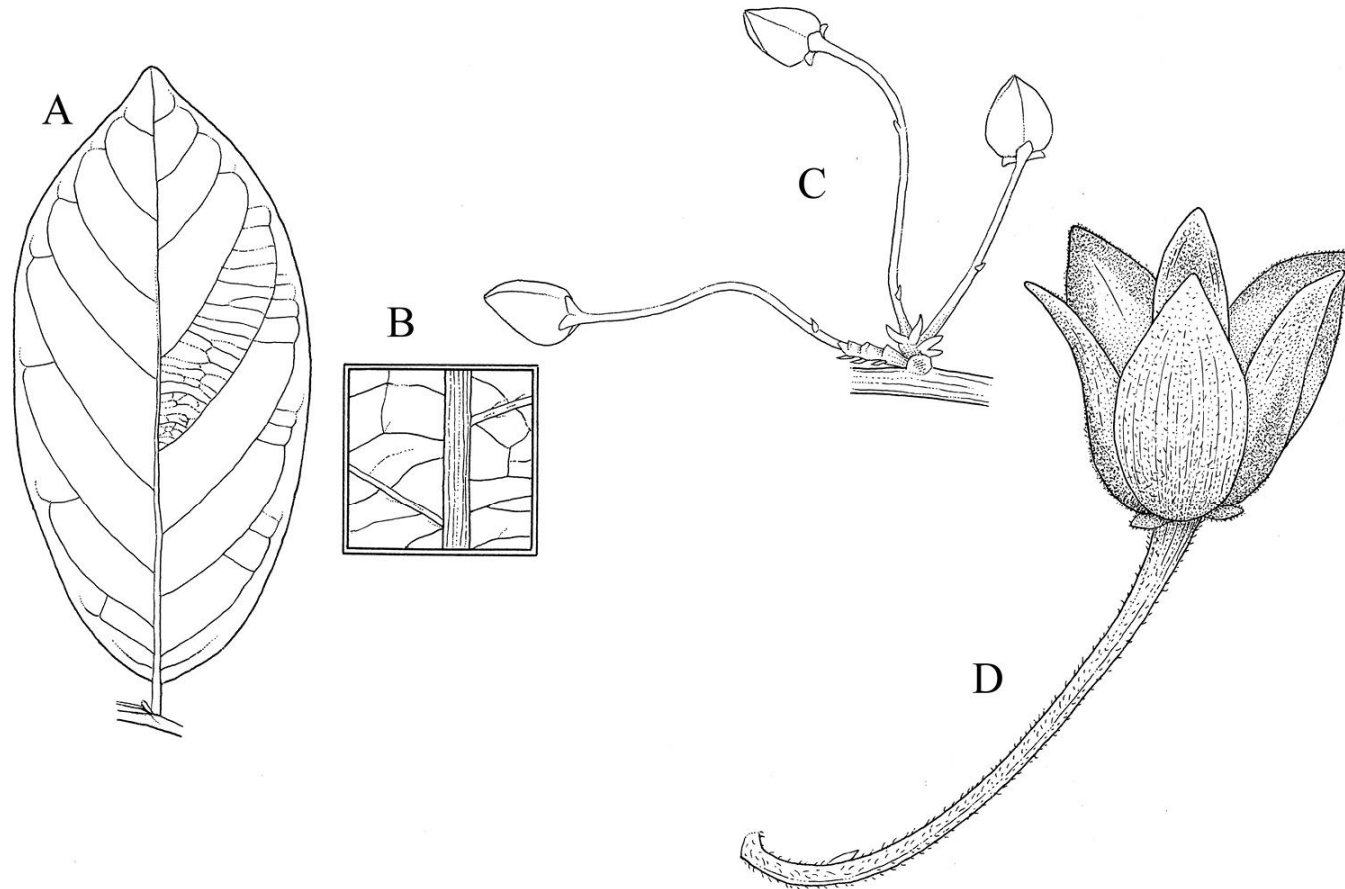
- Nine new species of the genus *Monanthotaxis*
- Two are from West Africa, four from western Central Africa, one from Tanzania, one from Southern Mozambique and one from the Comoros.
- **All species here described (except *M. filipes*) had already been collected at least 40 year ago, some even more than 100 years ago.**

Monanthotaxis atopostema

- *Monanthotaxis atopostema* P.H.Hoekstra, nom. nov.
- This species was described by Boutique (1951) as a variety of *M. klainei*.
- This species differs from *Monanthotaxis klainei* as mentioned by Boutique in the leaf shape, i.e. oblong to elliptic vs obovate in *M. klainei*, the rounded leaf base vs subcordate, the generally lower number of secondary veins (6–8 vs 7–12 in *M. klainei*) and it differs in the number of ovules per carpel (up to 6 vs 1 or 2 in *M. klainei*) and therefore also in the number of seeds per fruit.
- The epithet “atopostema” refers to the genus *Atopostema*.

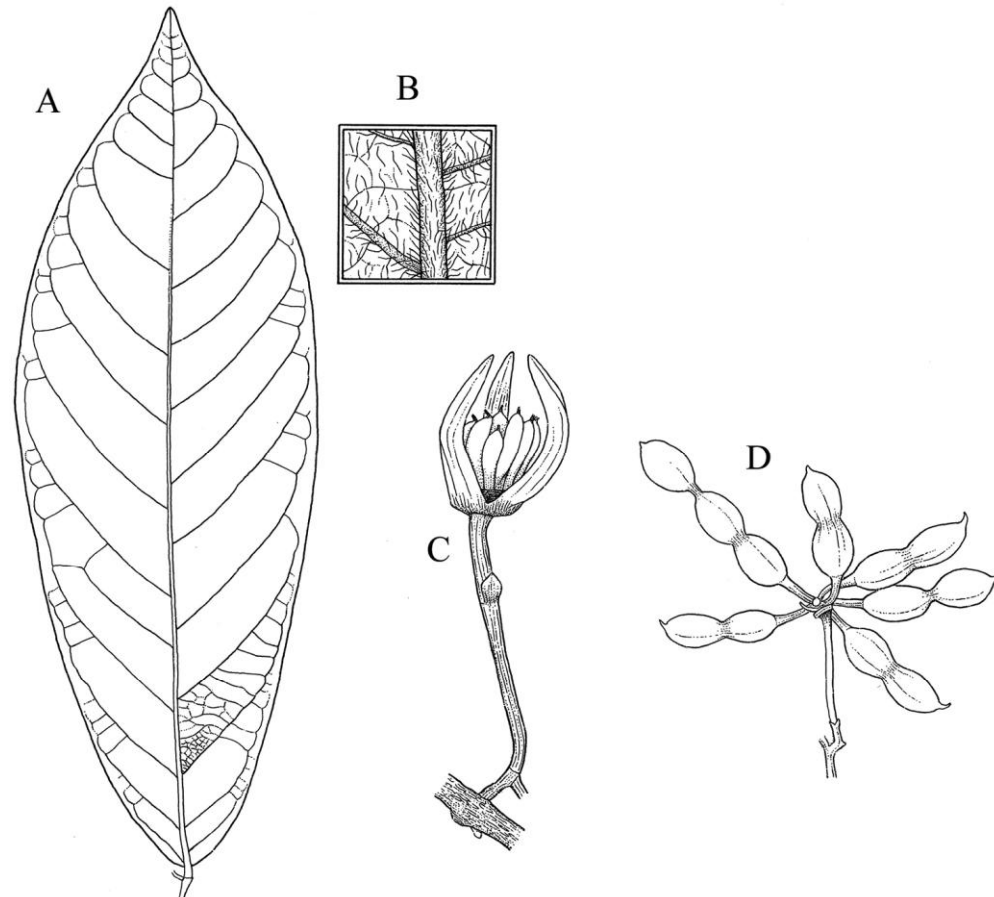
M. aquila

- *Monanthotaxis aquila* P.H.Hoekstra, sp. nov.



M. atewensis

- *Monanthotaxis atewensis* P.H.Hoekstra, sp. nov.



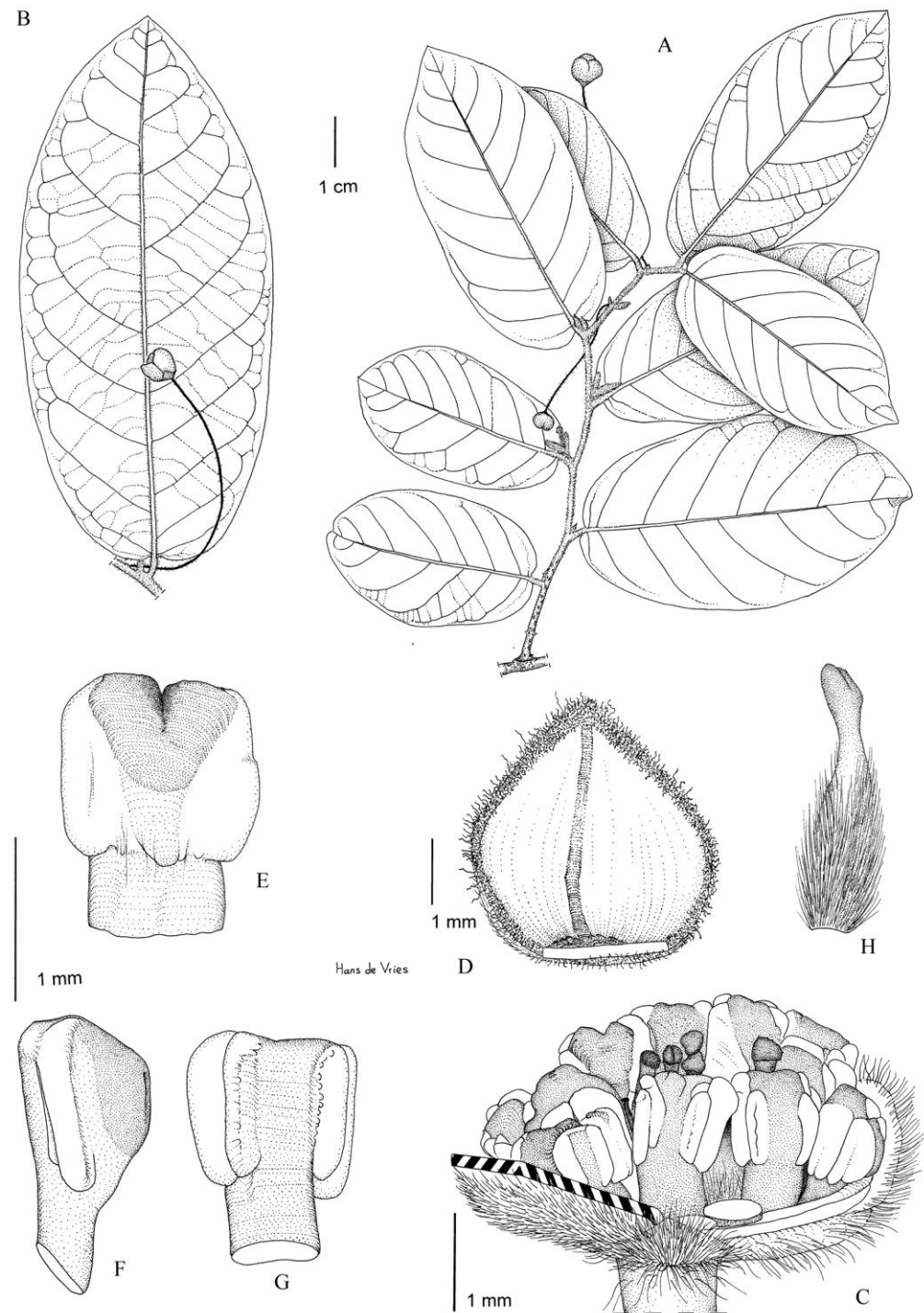
M. couvreurii

- *Monanthotaxis couvreurii*
P.H.Hoekstra, sp. nov.



M. filipes

- *Monanthotaxis filipes*
P.H.Hoekstra, sp. nov.



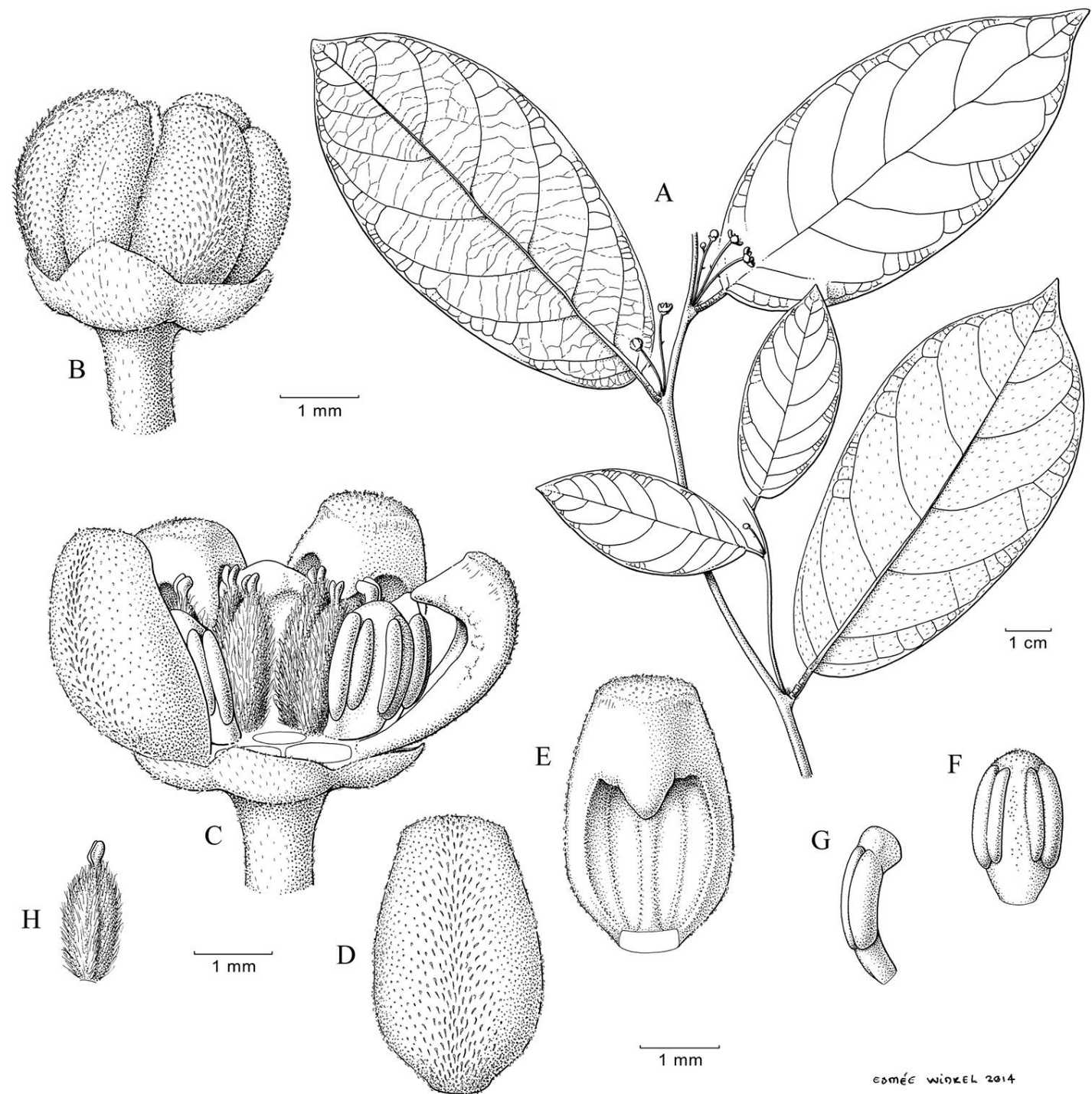
M. komorensis

- *Monanthotaxis komorensis* P.H.Hoekstra, sp. nov.



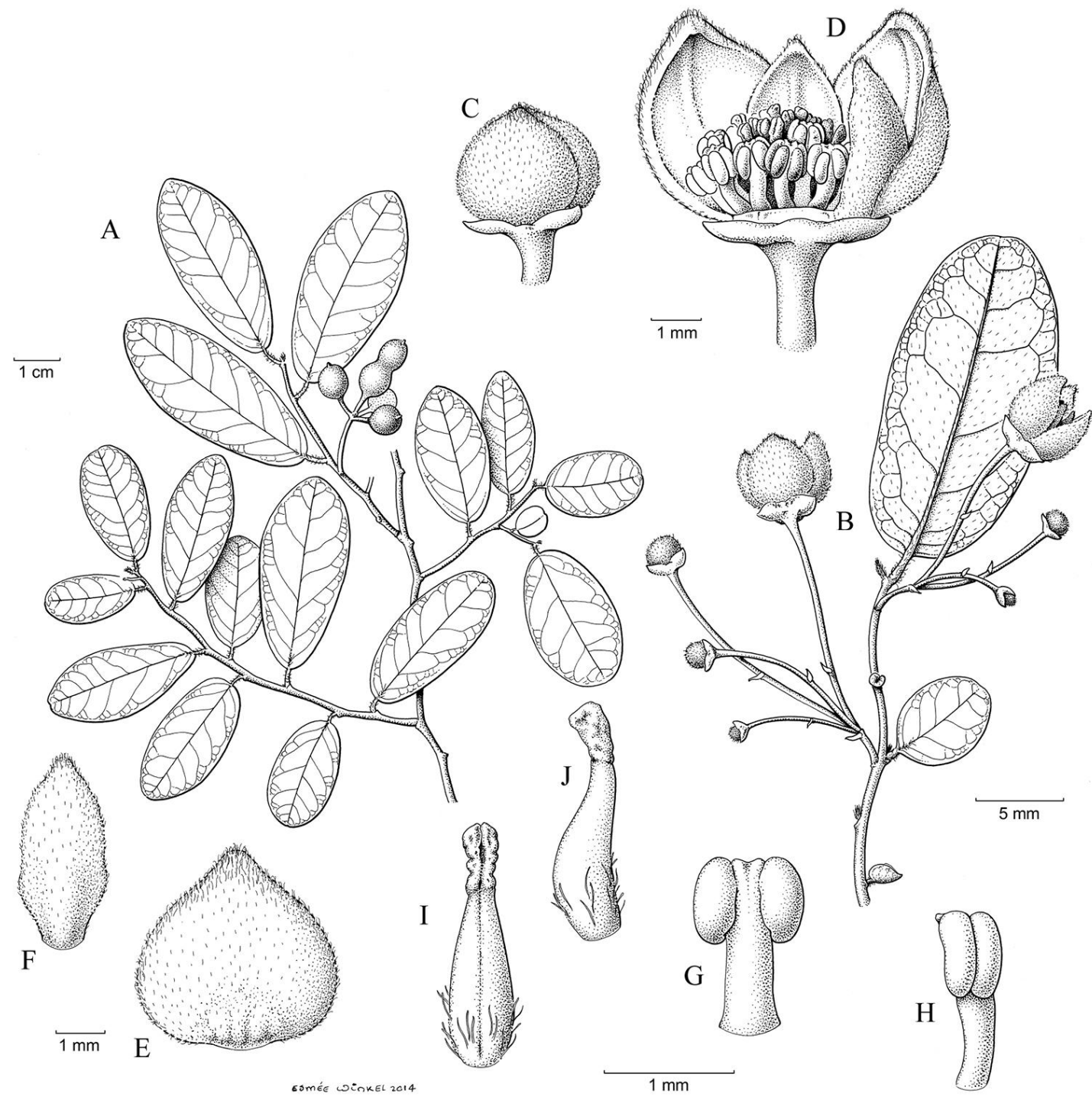
M. latistamina

- *Monanthotaxis latistamina*
P.H.Hoekstra, sp. nov.



M. maputensis

- *Monanthotaxis maputensis*
P.H.Hoekstra, sp. nov.



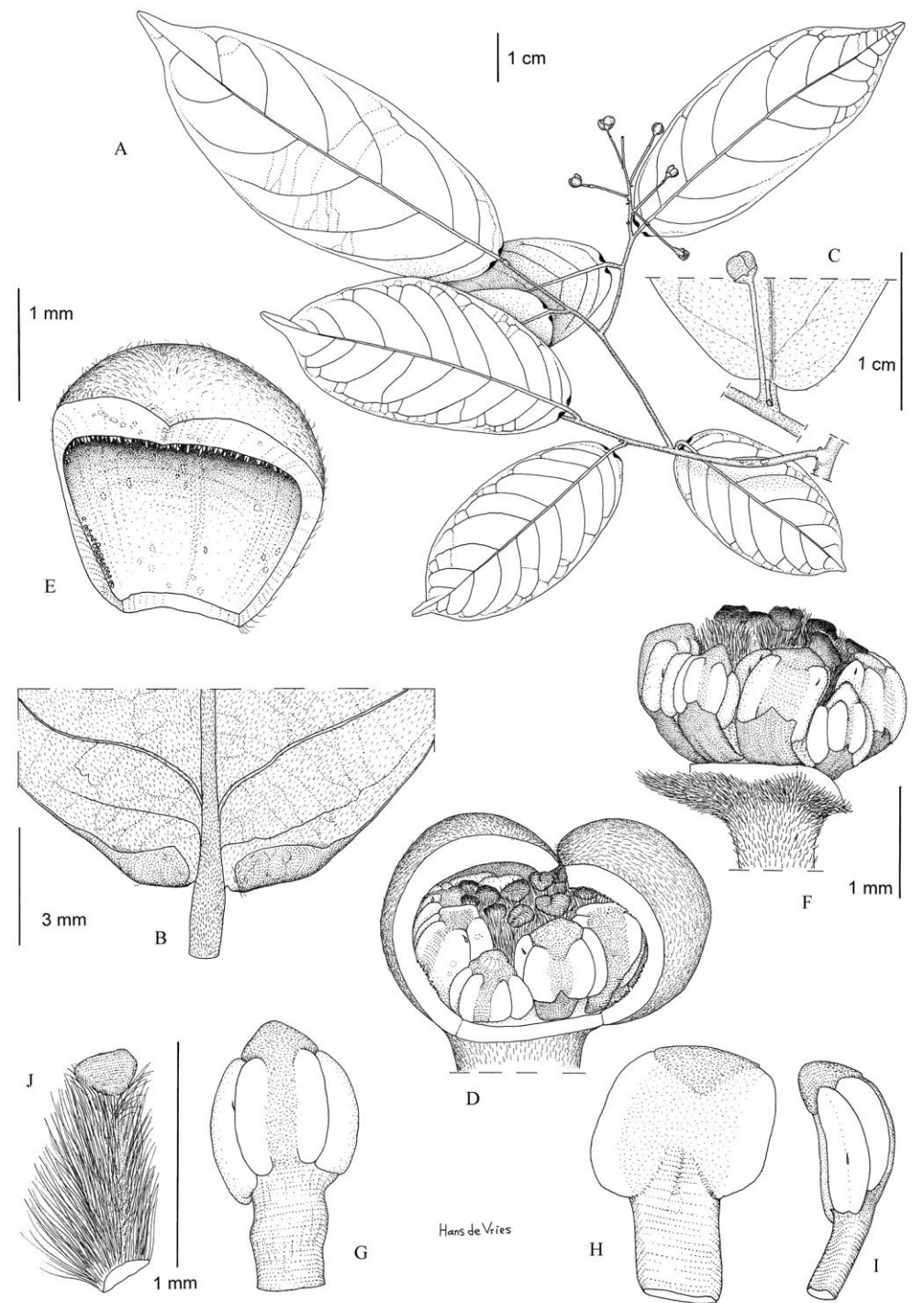
M. Maputensis (compared to: *M. caffra*)

- **Additional specimens examined (all paratypes, except when noted as excluded)**

- MOZAMBIQUE. Gaza: Macia-Messano, 28 Aug 1980, A. Nuvunga 292 (WAG [WAG0065948]); 3 km from Gumbo, 26 May 1965, A. Pereira 456 (MO [2177512], SRGH; excluded as paratype); between João Belo and Lumane, 6 Mar 1941, A.R. da Torre 2635 (LISC [LISC035251]). Inhambane: Massinga, Pomene, 10 km from Hotel to Rio Das Pedras, 16 Jul 1981, J. de Koning 9063 (LMA, MO [3880770]; excluded as paratype). Maputo: Marracuene, 12 km from Vila Luísa to Manhiça, M.F. Correia 578 (LISC, MO, SRGH); Ilha da Inhaca, 8 Jun 1970, M.F. Correia 1690 (LISC); Lourenço Marques, Ilha da Inhaca, 20 Jun 1973, M.F. Correia 2892 (M, MO); Maputo Reserve, 21 March 1976, M.A. Diniz 102 (MO [2830862], WAG [WAG0053942]); Goba, 23 Feb 1955, A.W. Exell 565 (LISC); Ilha da Inhaca, 19 May 1984, E.M.C. Groenendijk 1377 (MO [3877333], WAG [WAG0053945]); Ilha da Inhaca, 25 June 1984, E.M.C. Groenendijk 1426 (MO [3877334], WAG [WAG0053936]); Ilha da Inhaca, 28 Sep 1984, E.M.C. Groenendijk 1493 (MO [3877332], WAG [WAG0053944]); Ilha da Inhaca, 29 Jul 1985, E.M.C. Groenendijk 1760 (LMU, WAG [WAG0067887], WAG [WAG0067888]); Maputo, 13 Feb 1947, R.M. Hornby 2613 (L [L.1762399], P [P01954698], SRGH); Inhaca Island, 11 Aug 1980, P.C.M. Jansen 7375 (WAG [WAG0053938]); 5 km from Matola-Gare, 13 Feb 1982, P.C.M. Jansen 7808 (BR, G, LMA, WAG [WAG0243995], WAG [WAG0243996]); Rikati, Nov 1917, H.A. Junod 105 (G [G00308289]); Delagoa Bay, 1890, H.A. Junod 255 (G [G00308287]); Delagoa Bay, 1893, H.A. Junod 522 (G [G00308290]); nearby Bobole, 24 Nov 1978, J. de Koning 7316 (LISC, LMA, MO [3878659]); between Boane and Catuane, 12 Jun 1979, J. de Koning 7379 (K, LMU, MO [3880192], WAG [WAG0375988], WAG [WAG0375989]); 4 km from Catembe, 6 May 1981, J. de Koning 8680 (BR [BR0000013186029], K, LISC, MO [3306014], SRGH); Manhica, 3.5 km from Palmeira, 15 Apr 1975, A. Marques 2725 (WAG [WAG0053940]); Salamanga, 3 Jun 1948, F.A. Mendonça 4480 (MO); Salamanga, 3 Jul 1948, F.A. Mendonça 4493 (EA, WAG [WAG0053946]); Ilha da Inhaca, 3 Jul 1975, A.R. Moura 56 (MA [MA376952], WAG [WAG0053941]); Lourenço Marques, 6 Jun 1946, A. de A. Pimenta 8204 (LISC [2 sheets]); Ilha da Inhaca, 13 Feb 1965, J.E. Rodrigues 329 (WAG [WAG0053934]); Delagoa Bay, 6 Jan 1898, F.R.R. Schlechter 12006 (E [E00624364], G [G00308301], HBG, L [L 0188015], L [L 0188016], L [L 0188017], MO [3726269], P [P01954701], PH [PH00021144], US [553351]); Ilha da Inhaca, 6 Aug 1984, D. Zunguze 781 (WAG [WAG0071706]). SOUTH AFRICA. Kwazulu-Natal: Ndumu Game Reserve, 16 Feb 1969, E.S. Pooley 387 (E [E00624367], PRE); Usuthu Forest, 27 March 1969, 27 Mar 1969, E.S. Pooley 450 (E [E00624366], NU, PRE); Ndumu to Maputa km 23, 7 Mar 1973, F. White 10469 (FHO [00004050]); Tembe Elephant Park, 18 Nov 2000, P.C. Zietsman 4264 (MO [5837895], NY [00642339]).

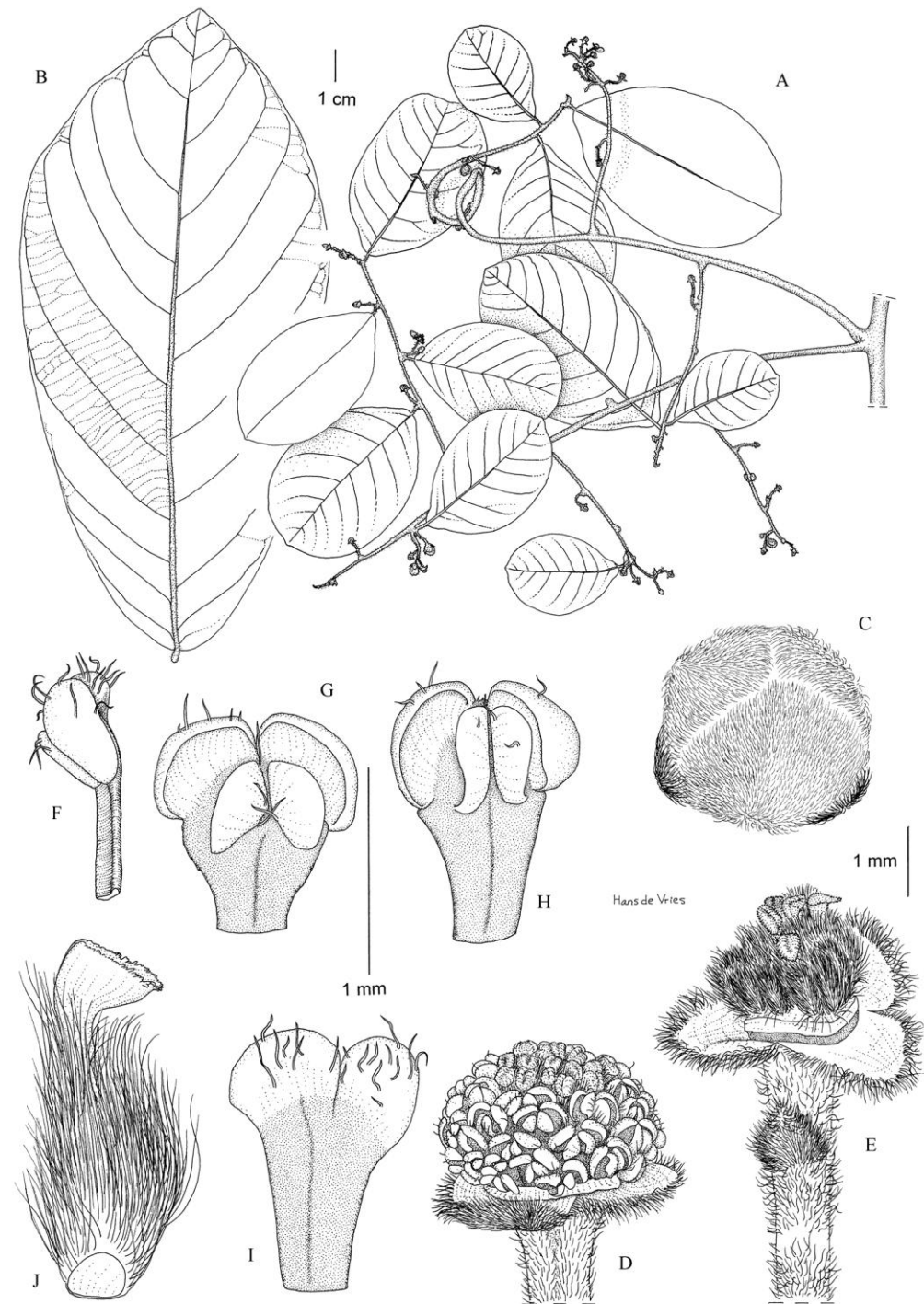
M. tripetala

- *Monanthotaxis tripetala*
P.H.Hoekstra, sp. nov.



M. zenkeri

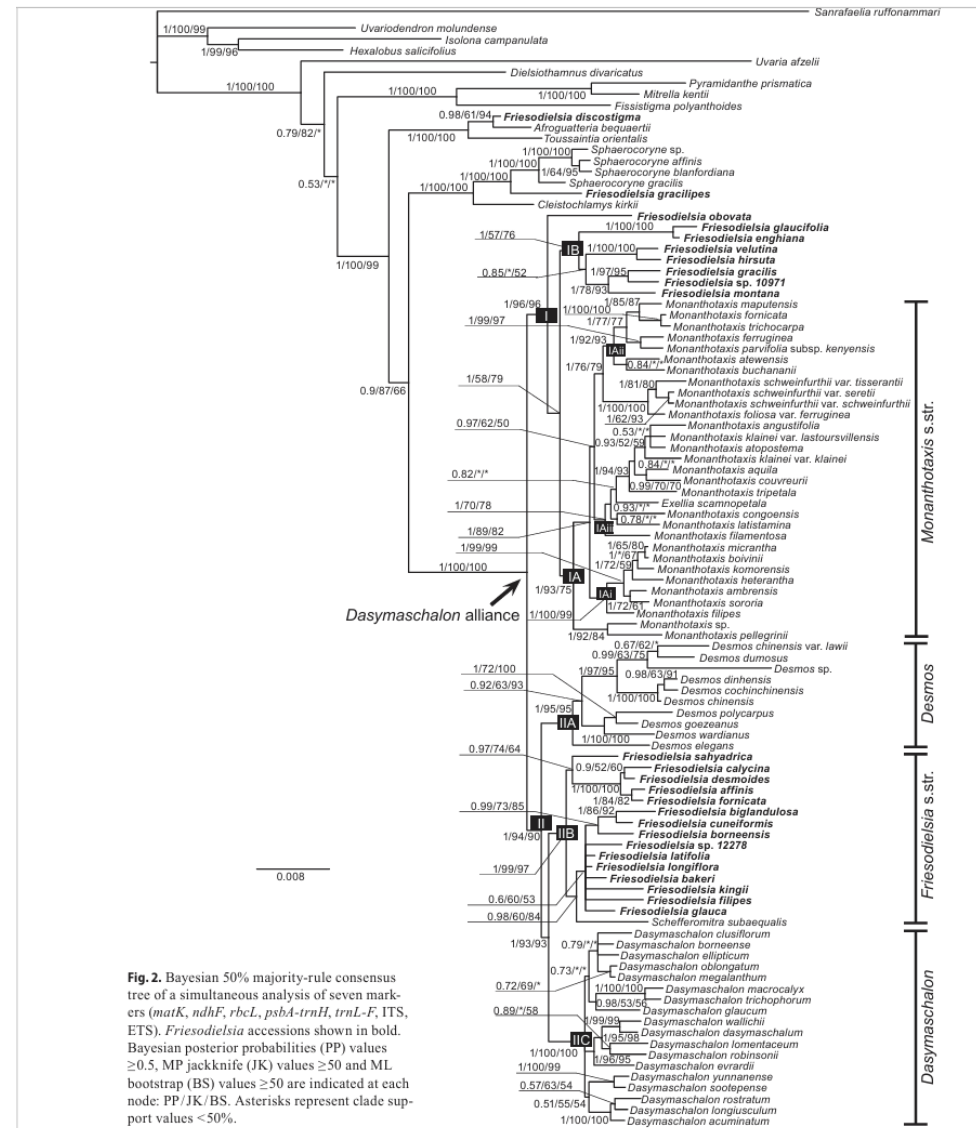
- *Monanthotaxis zenkeri*
P.H.Hoekstra, sp. nov.



A taxonomic revision of the genus

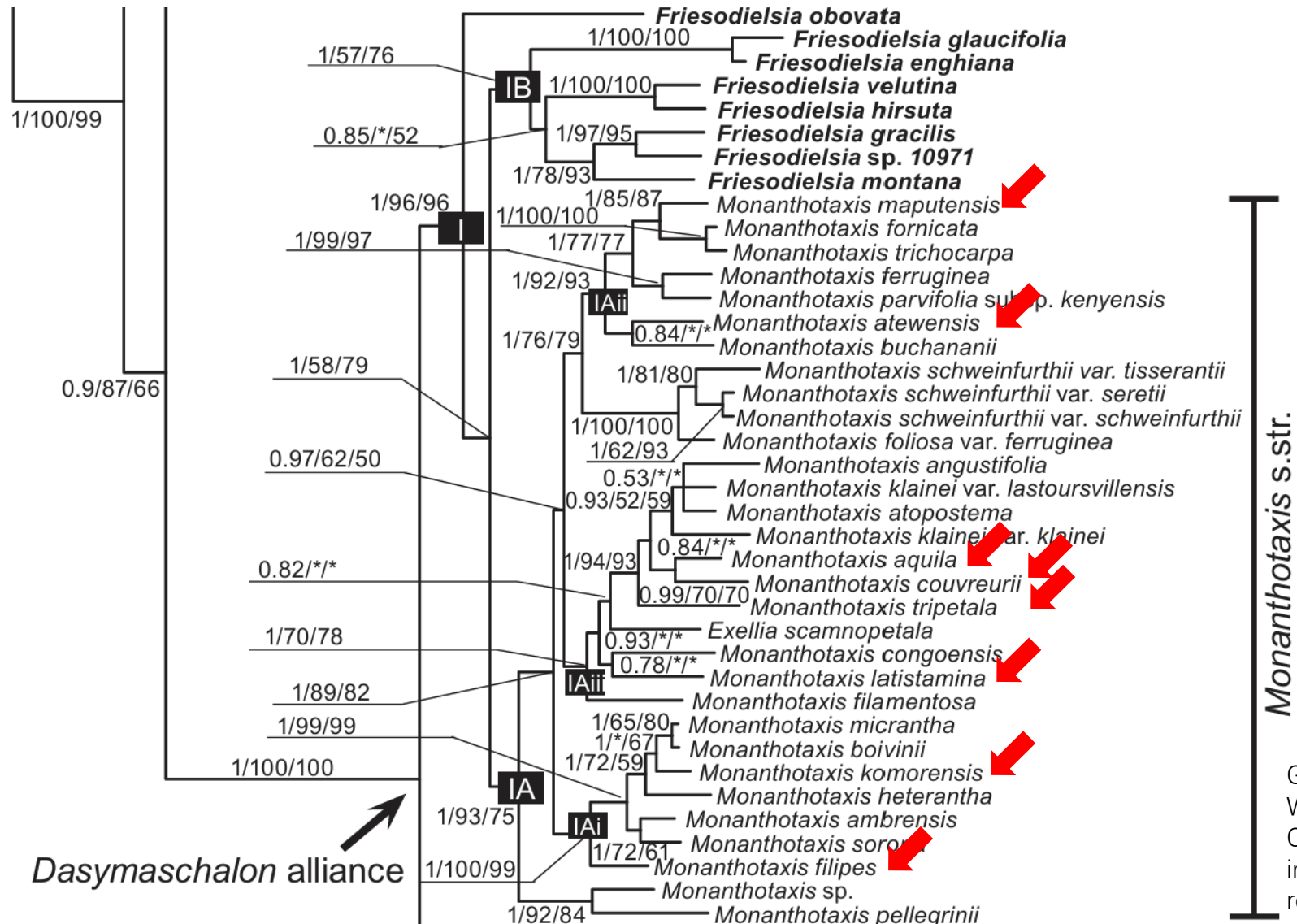
- morphological characteristics:
a climbing habit, glaucous leaves, loosely coherent floral chambers,
and moniliform monocarps.
- DNA sequences have confirmed their phylogenetic position within
Monanthotaxis (Guo et al.).

Phylogenetics of *Monanthotaxis*



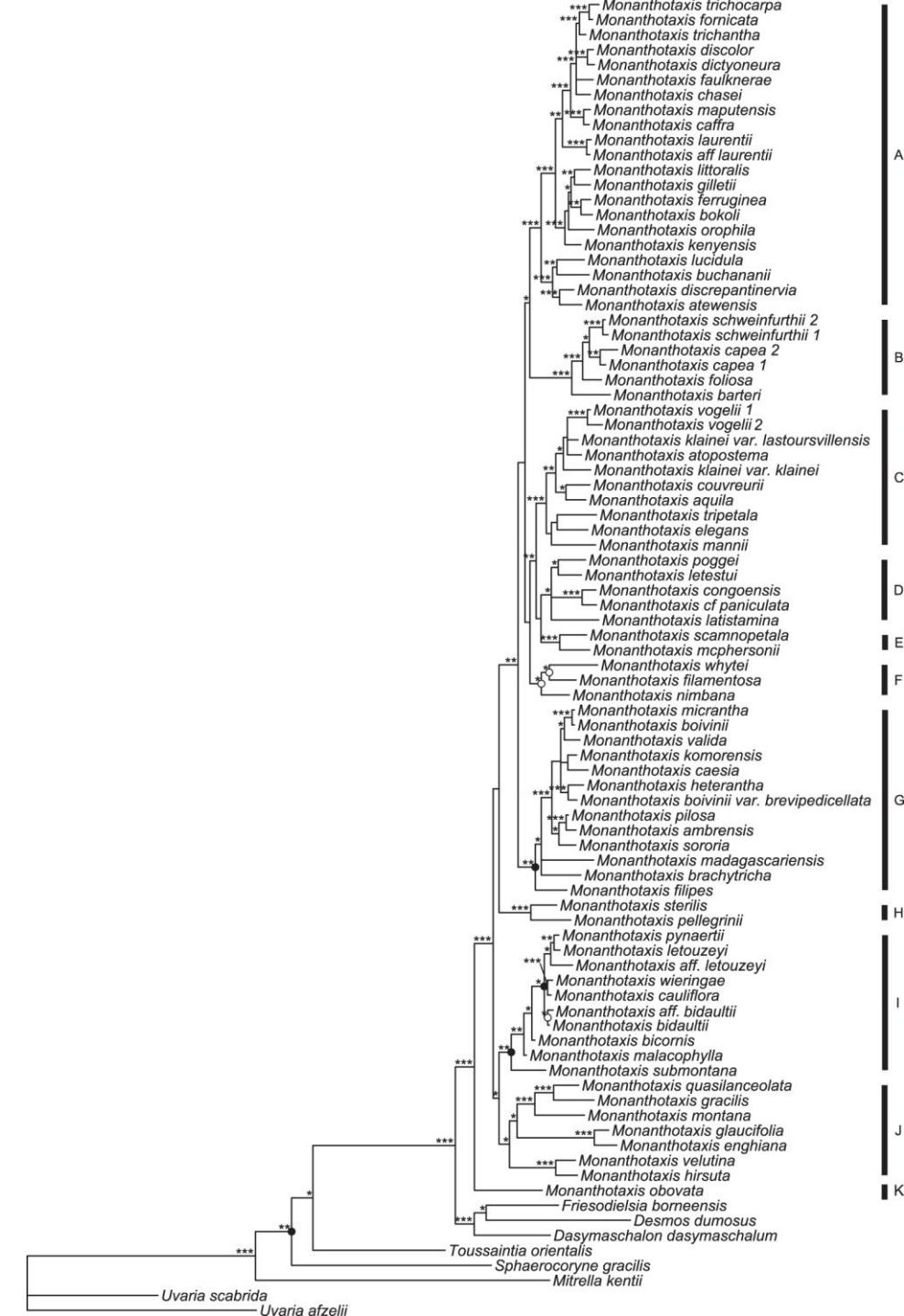
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Phylogenetics of *Monanthotaxis*



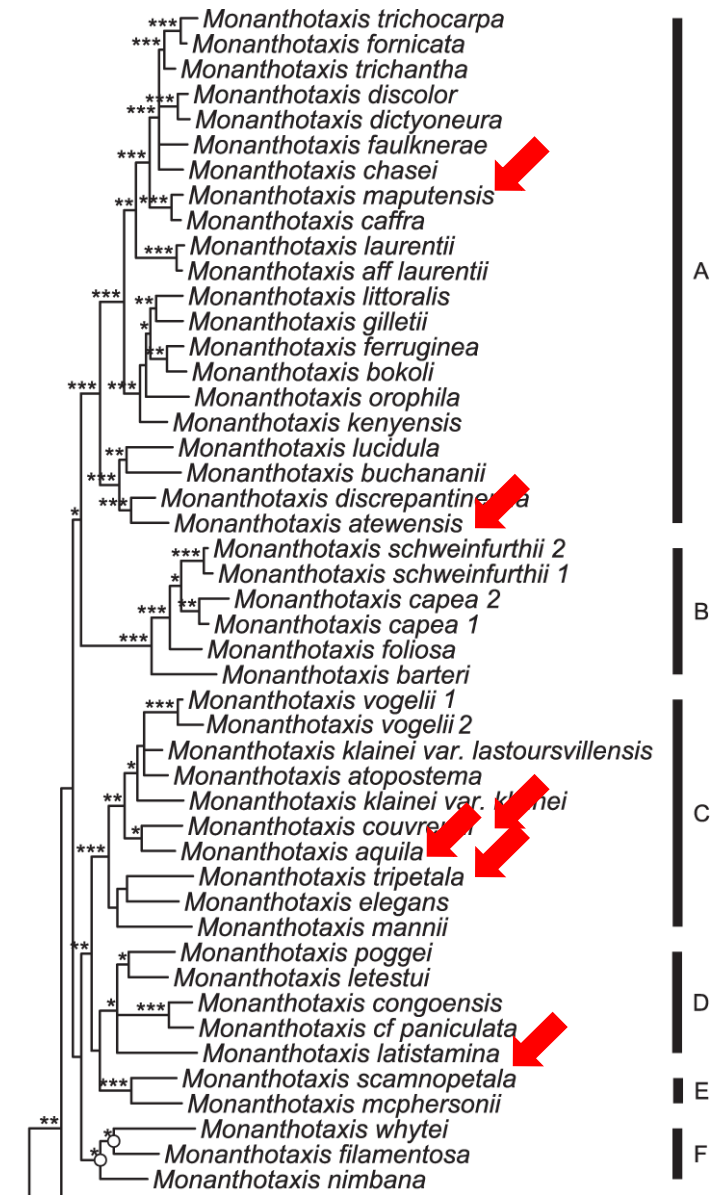
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Further Phylogenetics



Hoekstra, P. H., J. J. Wieringa, E. Smets, and L. W. Chatrou. 2018. Floral evolution by simplification in *Monanthotaxis* (Annonaceae) and hypotheses for pollination system shifts. *Scientific Reports* 8:12066.

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“Many people think that discovering new species is just about going on expeditions to exotic locations and collecting new specimens,.....”

“..... but the truth is that thousands of new plant species are lying neglected and unidentified in cupboards, drawers and cabinets around the world,”

---Oxford's Robert Scotland



The Gap between Specimen and Species

——Herbaria source of new plant species——

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