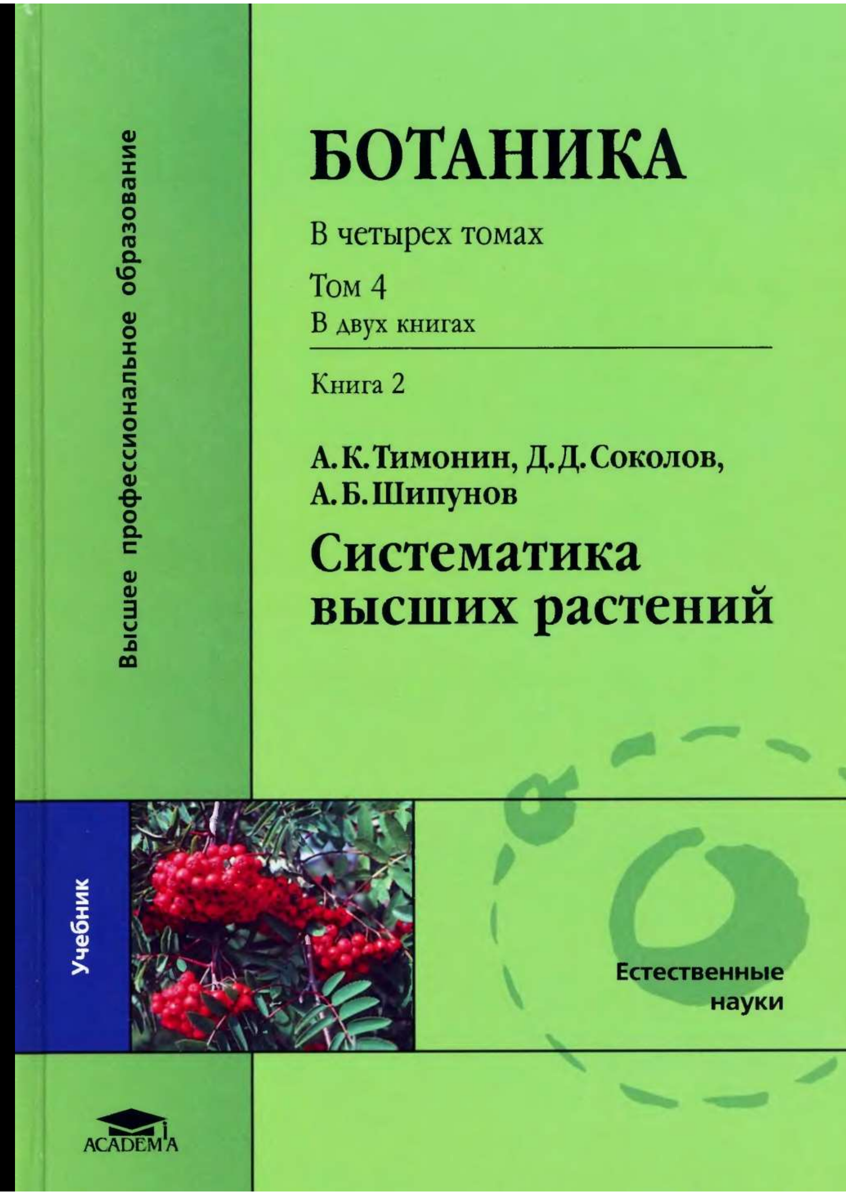
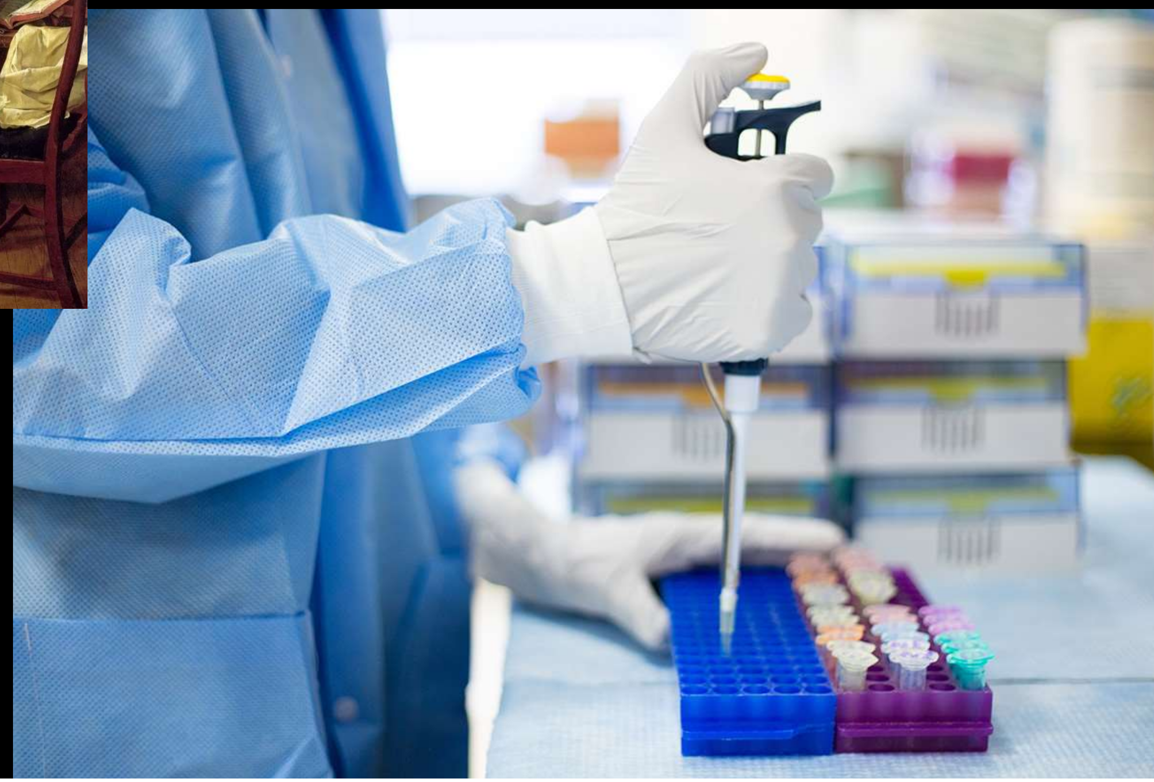
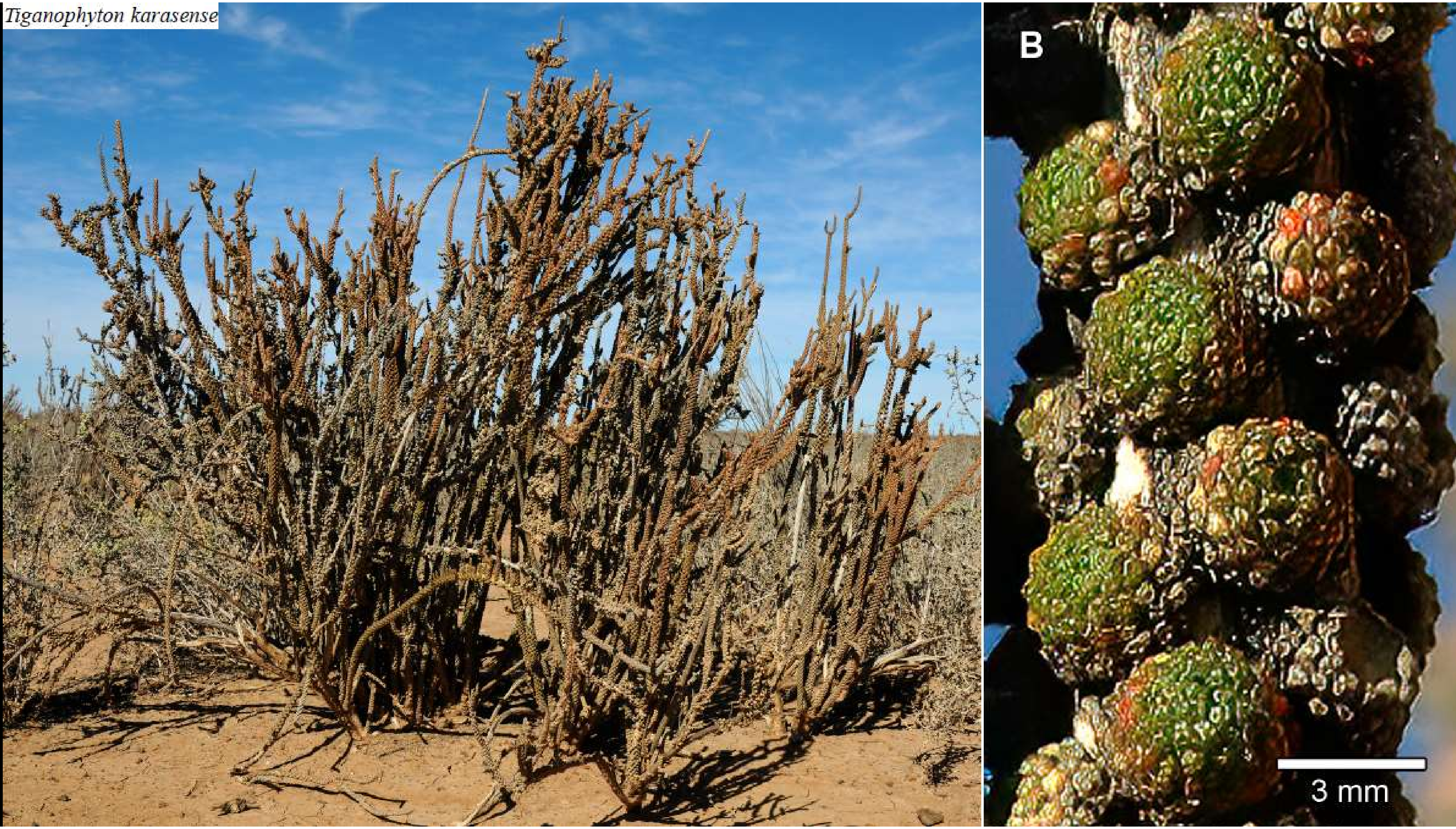
Контрольная на первом практикуме…

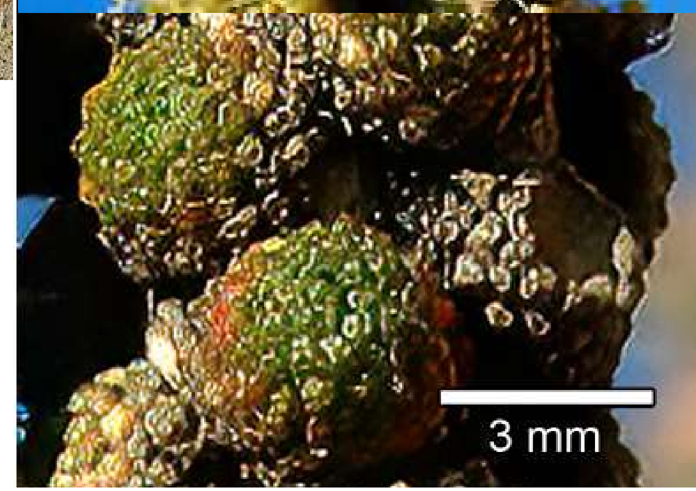
К.И. Мейер. Практический курс морфологии архегониальных растений. М, 1982






Tiganophyton karasense
B
3 mm



Phytotaxa 439 (3): 171–185
https://www.mapress.com/j/pt/

Article

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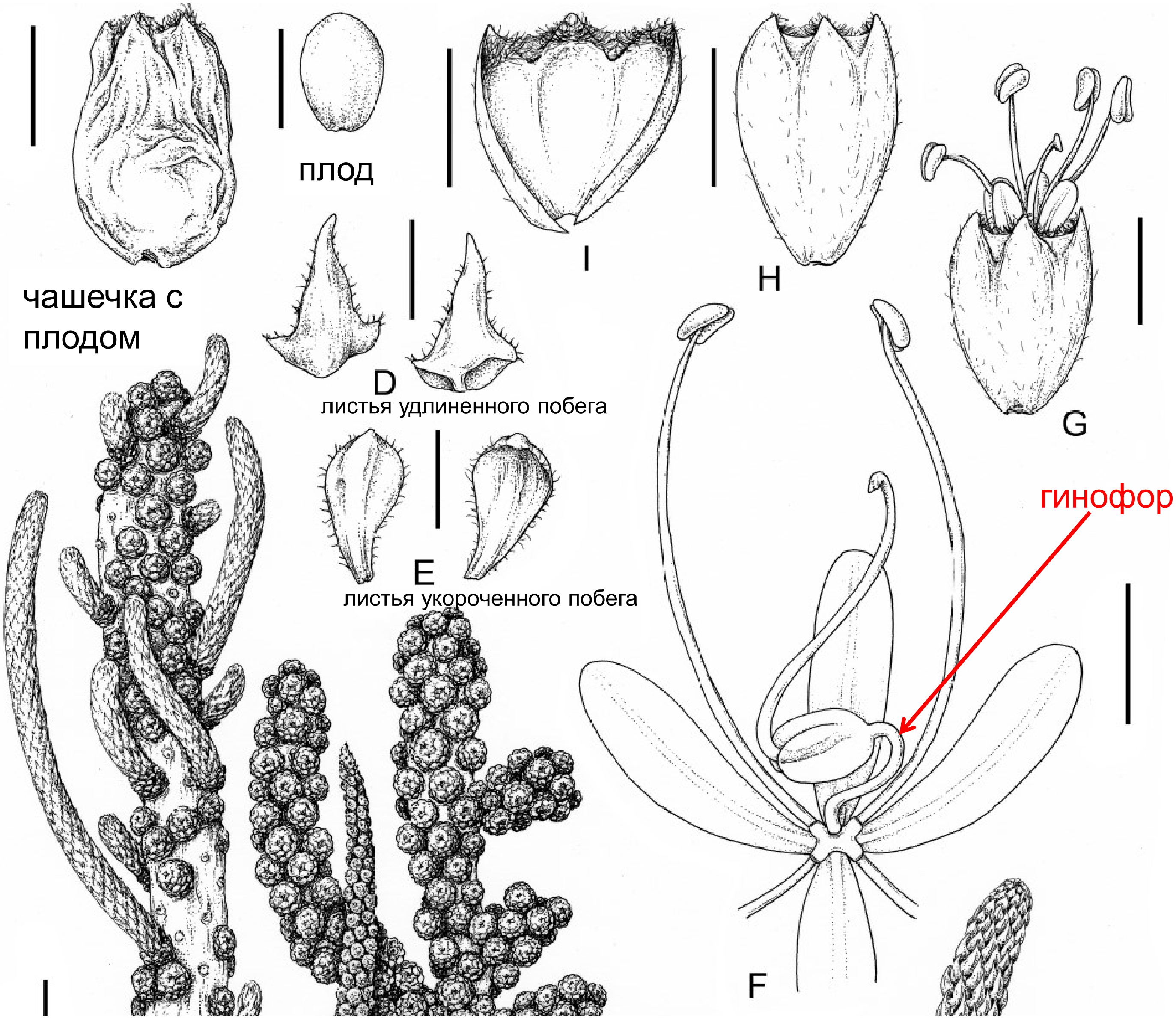
From the frying pan: an unusual dwarf shrub from Namibia turns out to be a new brassicalean family

WESSEL SWANEPOEL[1,2,6], MARK W. CHASE[3,4,7], MAARTEN J.M. CHRISTENHUSZ[3,4,8], OLIVIER MAURIN[3,9], FÉLIX FOREST[3,10] & ABRAHAM E. VAN WYK[2,5,11*]


чашечка с плодом
плод
I
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G
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листья удлиненного побега
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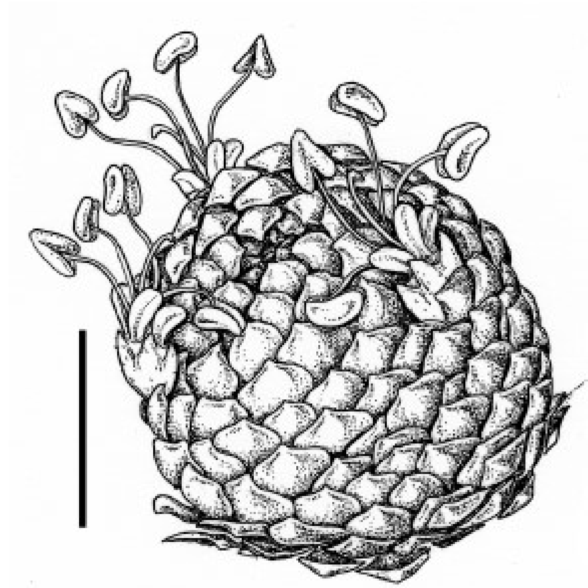
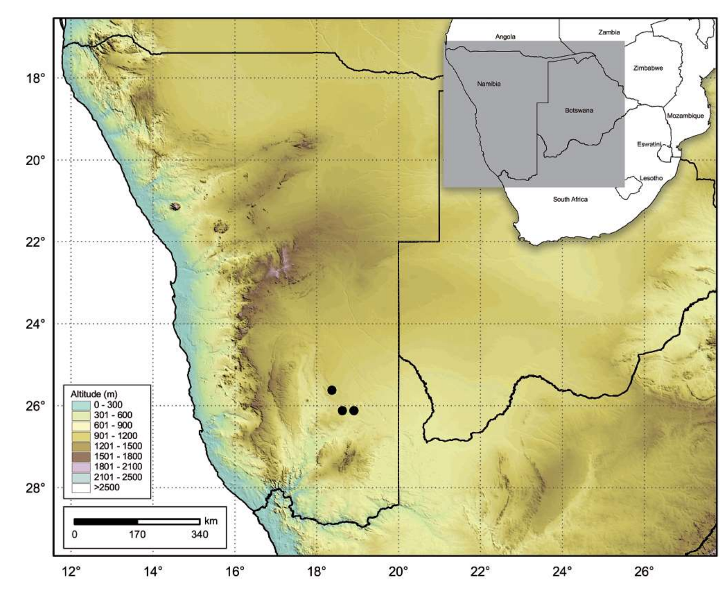
листья укороченного побега
гинофор
F



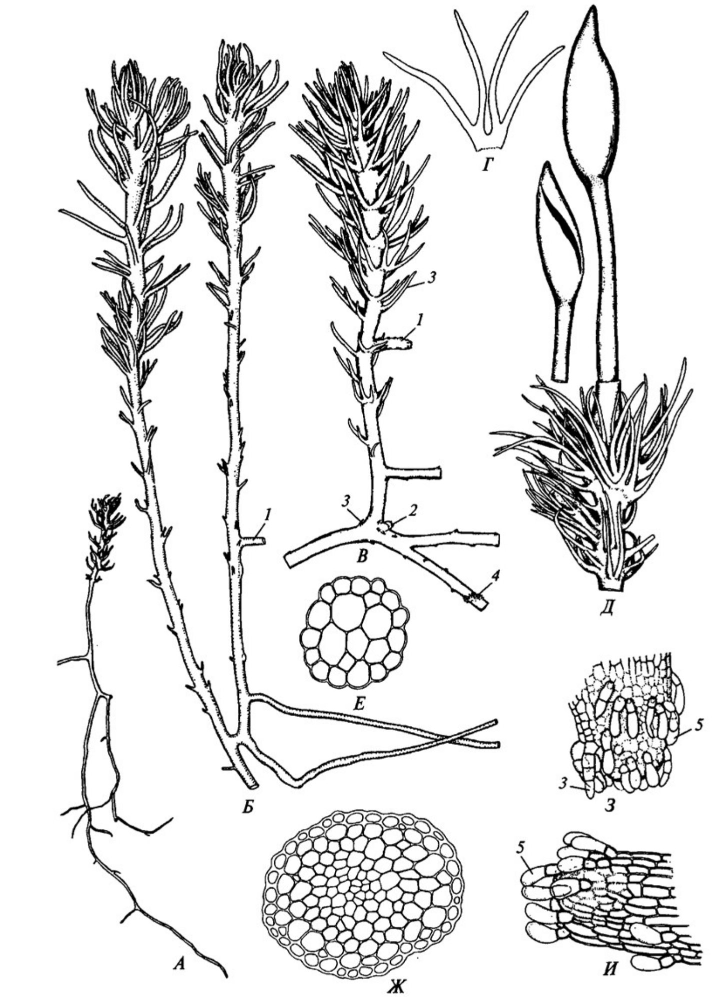

Angola
Zambia
Zimbabwe
Namibia
Botswana
Mozambique
Eswatini
Lesotho
South Africa
Altitude (m)
0 - 300
301 - 600
601 - 900
901 - 1200
1201 - 1500
1501 - 1800
1801 - 2100
2101 - 2500
>2500
km
0
170
340
18°
20°
22°
24°
26°
28°
12°
14°
16°
18°
20°
22°
24°
26°

Takakia

Род был описан в 1958 году. Его относили к печеночникам
(а иногда даже сближали с плауновидными)
до 1990, когда были найдены спорофиты

Takakia: 2 вида
(тихоокеанское побережье Сев. Америки, Алеутские о-ва, Борнео, Гималаи)

(Тимонин, Филин, 2009)



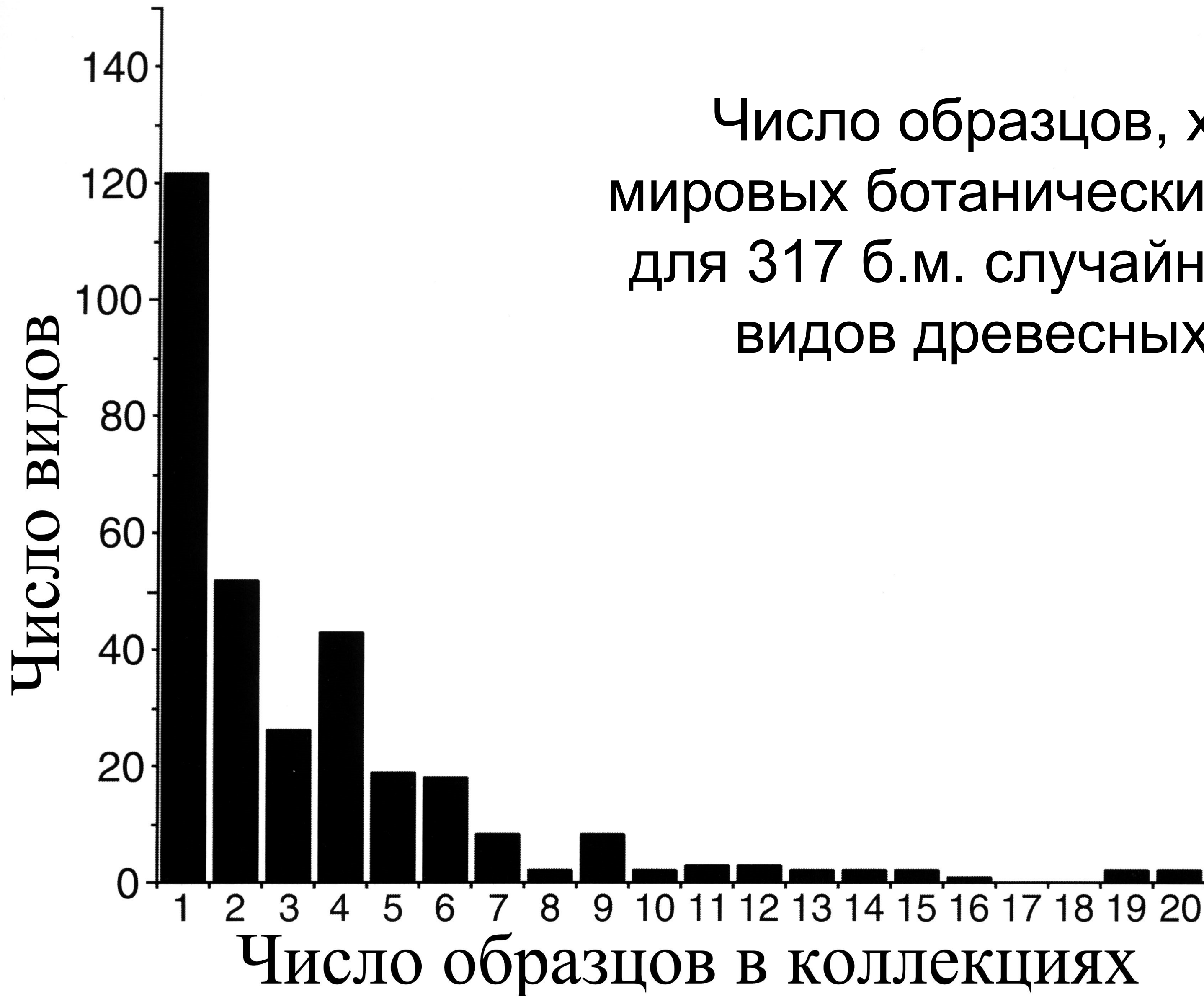
А, *Б* — побеги *T. lepidozioides*; *В*, *Г* — побег (*В*) и срединный лист (*Г*) *T. ceratophylla*; *Д* — вскрывшаяся коробочка (слева) и побег *T. ceratophylla* со зрелым спорогонием (справа); *Е*, *Ж* — поперечные срезы проксимальной части сегмента листа (*Е*) и стебля (*Ж*) *T. lepidozioides*; *З*, *И* — верхушки геотропной (*З*) и плагиотропной (*И*) осей *T. ceratophylla*; *1* — интеркалярная ветвь; *2* — верхушка спящей ветви; *3* — лист; *4* — клювовидные слизевые волоски; *5* — булавовидный слизевой волосок

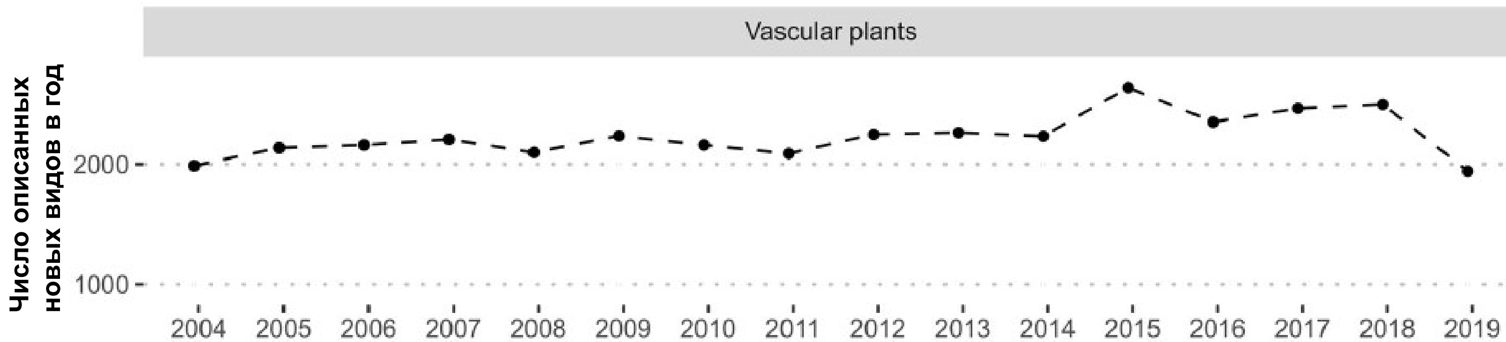
***Wollemia nobilis* –**
третий род семейства Araucariaceae

Новый род, описан из Австралии в 1994 г.

Ticodendron
incognitum

Число образцов, хранящихся в мировых ботанических коллекциях, для 317 б.м. случайно выбранных видов древесных тропических растений





The five plant families with most new species published in 2019 (IPNI, 2020).

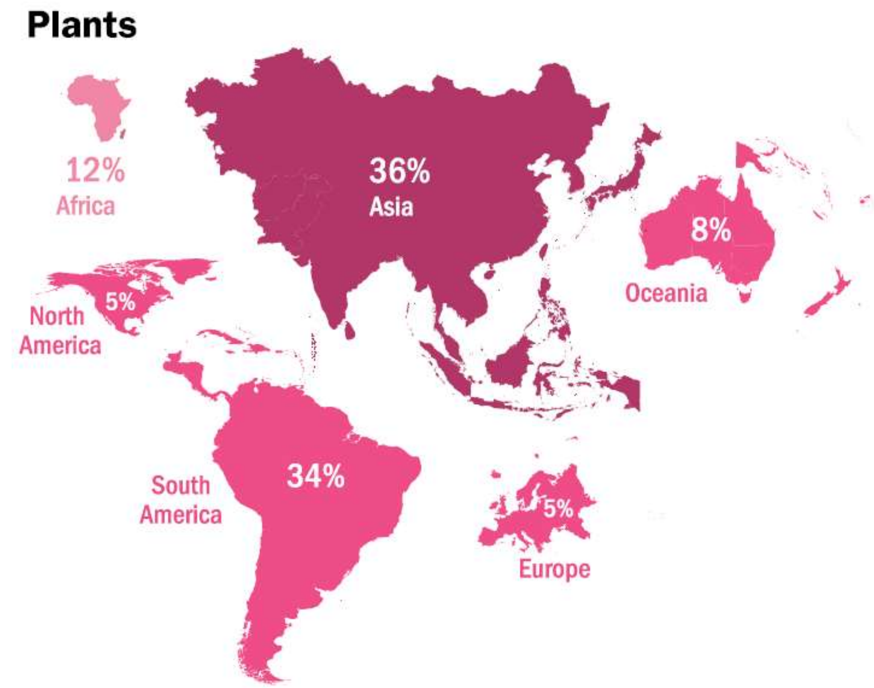
Family	Numbers of new species published in 2019
Orchidaceae	288
Rubiaceae	157
Compositae (Asteraceae)	100
Araceae	78
Leguminosae	71

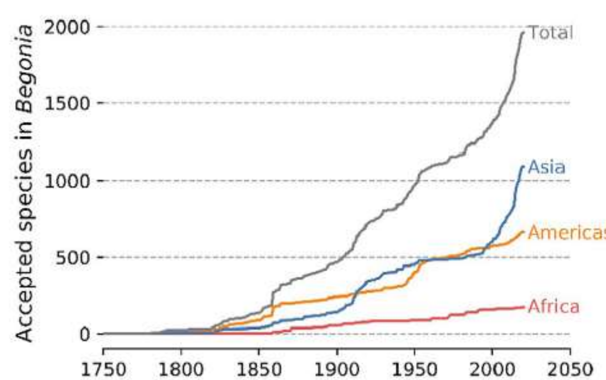
The top five vascular plant families in terms of numbers of accepted species (WCVP, 2020).

Family	Global totals species (rounded to nearest 1,000)
Compositae (Asteraceae)	32,000
Orchidaceae	30,000
Leguminosae (Fabaceae)	22,000
Rubiaceae	14,000
Gramineae (Poaceae)	12,000

Plants, People, Planet. 2020;2:371–388.

Galanthus bursanus (Amaryllidaceae) from Turkey, discovered on Facebook. Photo: D.Zubkov;





Plants, People, Planet. 2020;2:371–388.

Vaccinium (Ericaceae): около 450 видов, большое разнообразие в горных районах тропиков

Vaccinium bullatum

Первое описание и изображение цветка
Пыльники склеены в трубку
Придатки пыльников диморфные, перекрещиваются через один
(Nuraliev et al., 2020)

Vaccinium uliginosum - голубика

узкий ареал

сайт кафедры:
msu-botany.ru

Новые для науки виды, подвиды и разновидности, описанные сотрудниками и аспирантами кафедры высших растений за 1993-2018 гг. (значки – типовые местонахождения)

Biermannia longicheila Aver. & Nuraliev (Orchidaceae). Вьетнам.

Tripleurospermum nathaliae A.Zernov (Asteraceae). Краснодарский край, Россия.

Aspidistra xuansonensis Vislobokov (Asparagaceae). Вьетнам.

Shortia rotata Gaddy & Nuraliev (Diapensiaceae). Вьетнам.

Arthrocnemum franzii Sukhor. (Amaranthaceae). Кабо-Верде.

Strobilanthes barbigera J.R.I.Wood, Nuraliev & Scotland (Acanthaceae). Вьетнам.

Symphytum × mosquense S.R.Majorov & D.D.Sokoloff (Boraginaceae). Москва.

Lotus stepposus Kramina (Fabaceae). Украина.

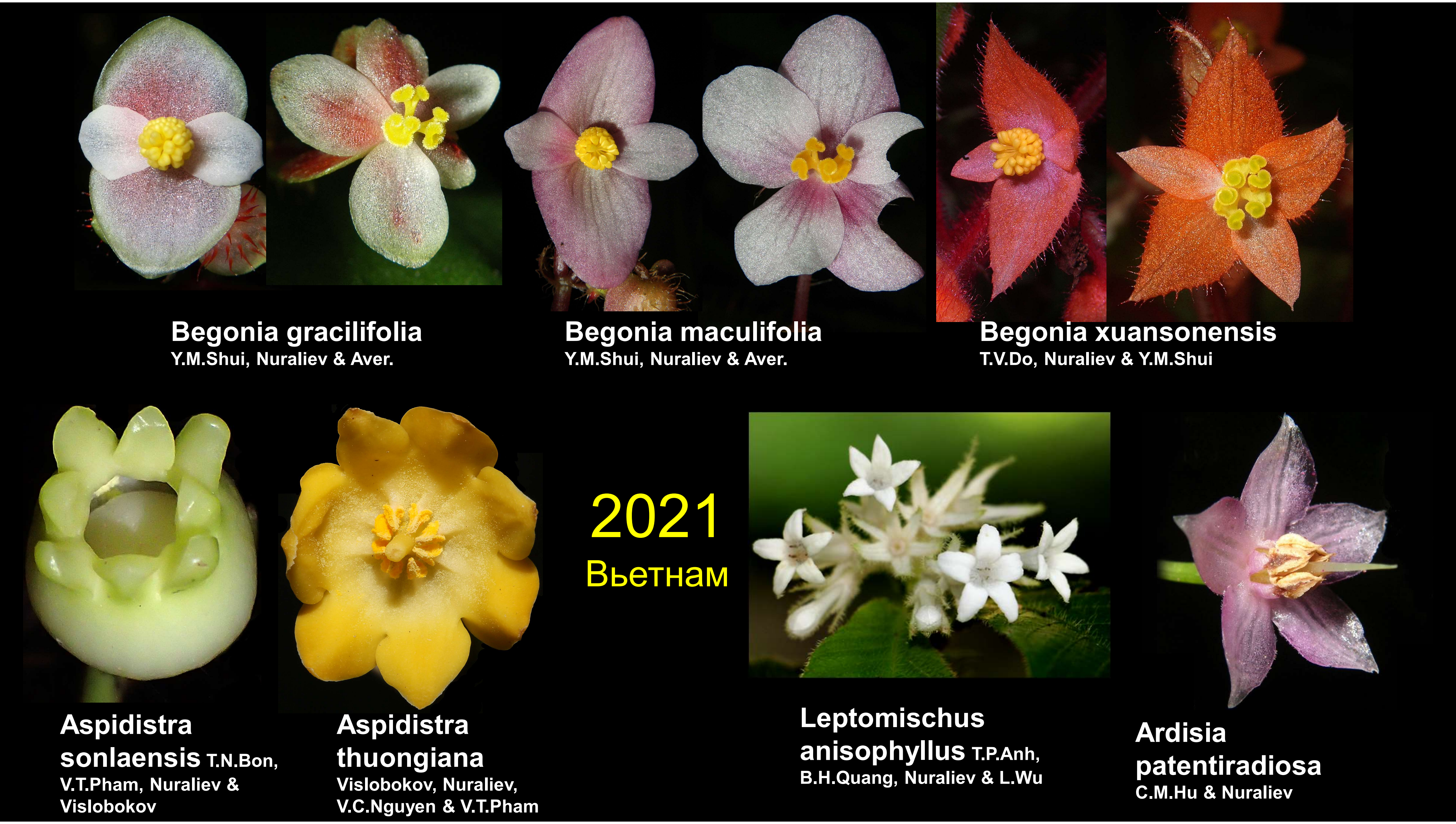
Corbichonia exellii Sukhor. (Lophiocarpaceae). Намибия.

Argostemma cordatum Nuraliev (Rubiaceae). Вьетнам.

Seychellaria barbata Nuraliev & Cheek (Triuridaceae). Мадагаскар.

Thismia mucronata Nuraliev (Thismiaceae). Вьетнам.

Trithuria cowieana D.D.Sokoloff, Remizowa, T.D.Macfarl. & Rudall (Hydatellaceae). Австралия.



Begonia gracilifolia
Y.M.Shui, Nuraliev & Aver.
Begonia maculifolia
Y.M.Shui, Nuraliev & Aver.
Begonia xuansonensis
T.V.Do, Nuraliev & Y.M.Shui
Aspidistra sonlaensis T.N.Bon, V.T.Pham, Nuraliev & Vislobokov
Aspidistra thuongiana Vislobokov, Nuraliev, V.C.Nguyen & V.T.Pham
2021
Вьетнам
Leptomischus anisophyllus T.P.Anh, B.H.Quang, Nuraliev & L.Wu
Ardisia patentiradiosa C.M.Hu & Nuraliev

Aspidistra elatior

Feddes Repertorium 116 (2005) 5–6, 313–338 DOI: 10.1002/fedr.200511076 Weinheim, Oktober 2005

Ludwig-Maximilian-Universität München, Fakultät für Biologie – Systematische Botanik und Mykologie

H.-J. TILLICH

A key for *Aspidistra* (Ruscaceae), including fifteen new species from Vietnam[1]

With one Map and 3 Figures

Summary

Fifteen species and two subspecies of *Aspidistra* (Ruscaceae, Monocotyledons) from Vietnam new to science are described. This raises the number of known species to 76 and extends the genus area to South Vietnam at ca. 12° N. Additionally, a detailed new key is given to determine all recently known species in *Aspidistra*.

New species: *Aspidistra atroviolaca, A. bicolor, A. bogneri, A. carnosa, A. connata, A. foliosa, A. geastrum, A. lateralis, A. lutea, A. marasmioides, A. opaca, A. petiolata, A. stricta, A. subrotata, A. superba.*

New subspecies: *Aspidistra arnautovii* sp. nova, subsp. *arnautovii, A. arnautovii* subsp. nova *catbaensis, A. subrotata* subsp. nova *crassinervis*.

New combinations: *Aspidistra dodecandra, A. glandulosa.*

Zusammenfassung

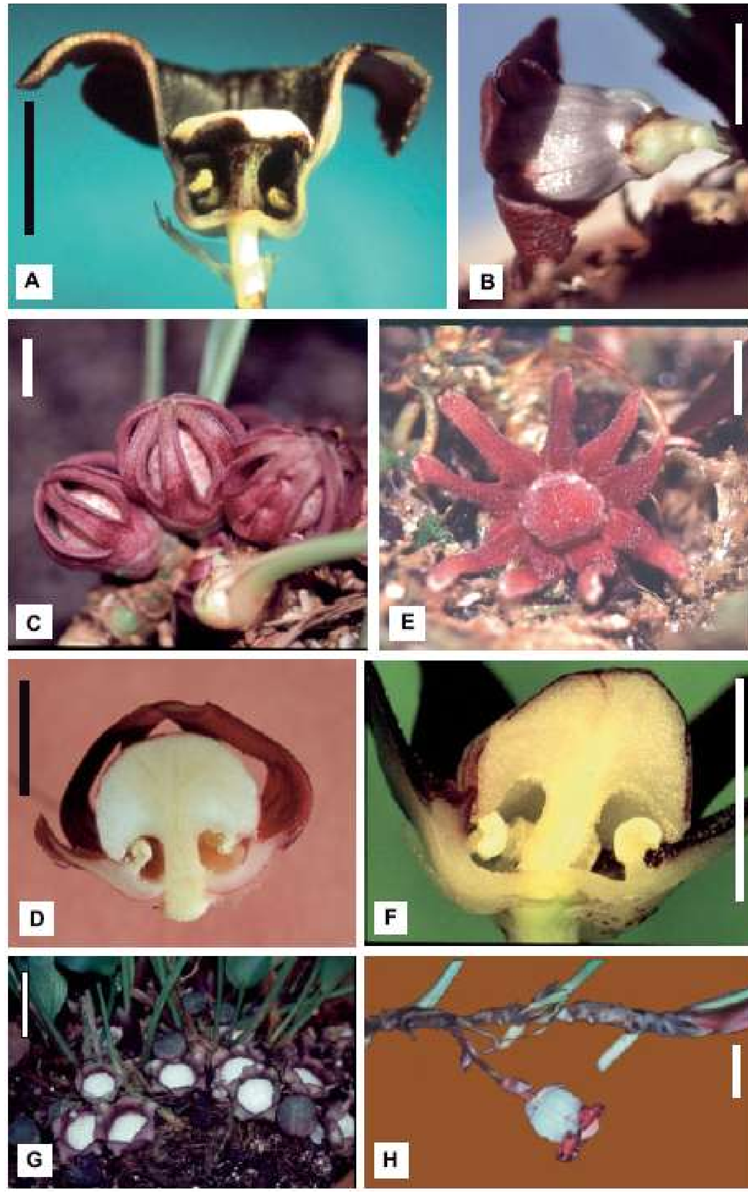
Ein Schlüssel für die Gattung *Aspidistra* (Ruscacaea) einschließlich 15 neue Arten aus Vietnam

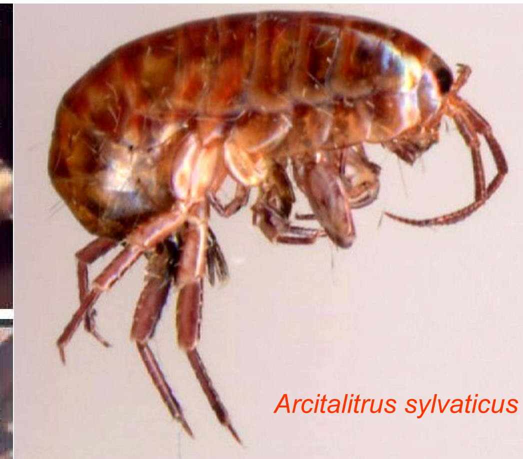
Es werden 15 neue Arten und zwei neue Unterarten der Gattung *Aspidistra* (Ruscaceae, Monocotyledoneae) beschrieben. Damit erhöht sich die Zahl der bekannten Arten auf 76. Das Areal der Gattung reicht nun bis in das südliche Vietnam bei ca. 12° N. Zusätzlich wird ein neuer Bestimmungsschlüssel für alle derzeit bekannten Arten der Gattung vorgestellt.

Introduction

The family Ruscaceae has a Northern Hemisphere distribution with a center of diversity in South-Eastern Asia (following ANGIOSPERM PHYLOGENY GROUP 2003), the name Ruscaceae SPRENG. (1826) has priority over Convallariaceae HORAN. (1834). The genus *Aspidistra* is a typical South-East Asian element of that family. It was introduced by KER-GAWLER (1822) with *A. lurida* from China. During the following 150 years only ten more species were described (LINDLEY 1826; BLUME 1834; BAILLON 1894; STAPF 1903; HAYATA 1912, 1920; GAGNEPAIN 1934a, b; P'EI 1939). Even CONRAN & TAMURA (1998) estimated only „about 11 spp". A more realistic approach is given in the new English edition of the Flora of China in distinguishing 49 species (LIANG & TAMURA 2000). Indeed, the number of known species has increased remarkably during the past two or three decades, and the increase in species number continues indicating that for a long period of time these understorey plants of warm-temperate to (sub-)tropical rain- and monsoon-forests have been widely overlooked (CHUN & HOW 1977; LANG 1978, 1981; ZHU & ZHANG 1981; CHEN & FANG 1982; LANG & ZHU 1982, 1984; WAN 1984a, b, 1985, 1987, 1989; HUANG 1986; WAN & HUANG 1987; LI 1988; PENG 1989; TAO 1992; FANG, YEN & ZENG 1993; LI, LONG & BOGNER 1998; LANG et al. 1999; FANG & YU 2002; HE 2002; LI & TANG 2002; TANG & LIU 2003; BOGNER & ARNAUTOV 2004; BRÄUCHLER & NGOC 2005; TILLICH 2006).

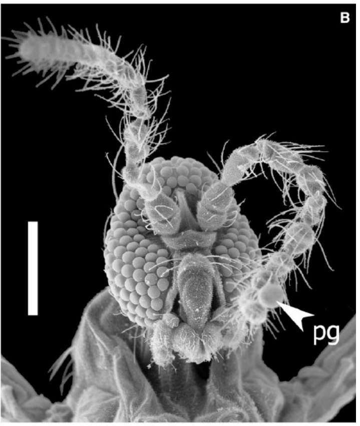
[1] Dedicated belatedly to Dr. hc. Josef Bogner on the occasion of his 65. birthday.

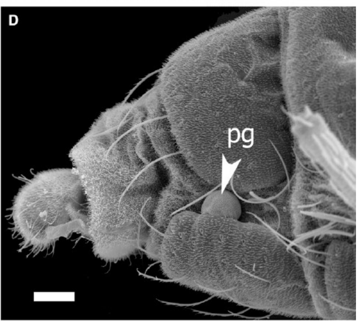


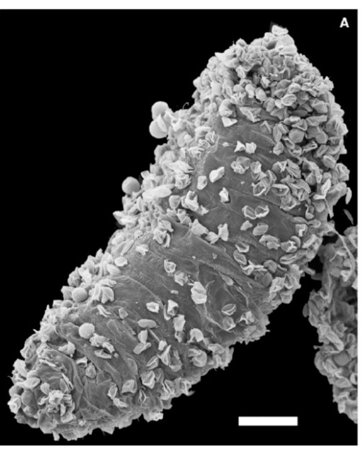


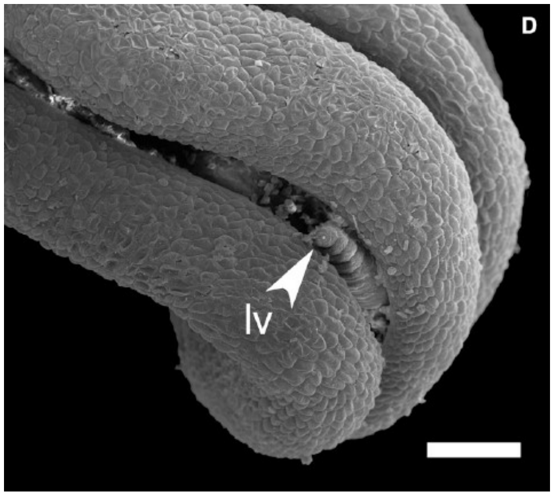
Aspidistra
1998 – 11 видов
2000 – 49 видов
2005 – 80 видов
2015 – 130 видов
2017 – 145 видов
2020 – 180 видов

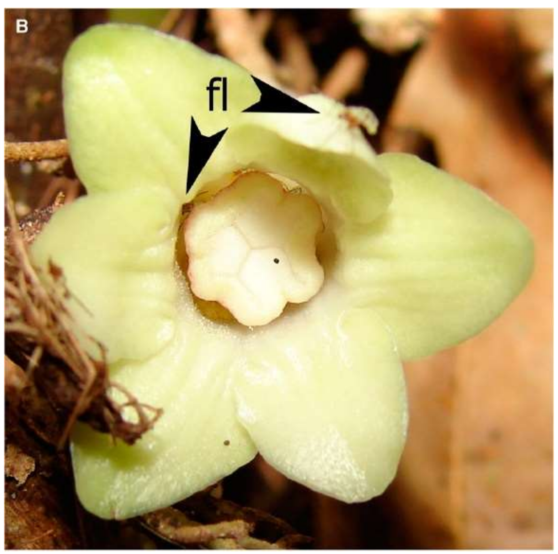
Новый вариант взаимодействия опылителей и растений: личинки опылителя развиваются в пыльниках обоеполых цветков

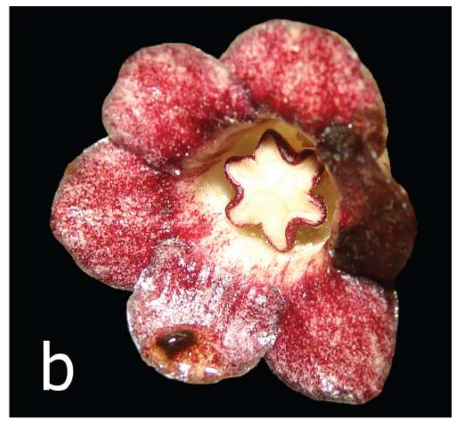


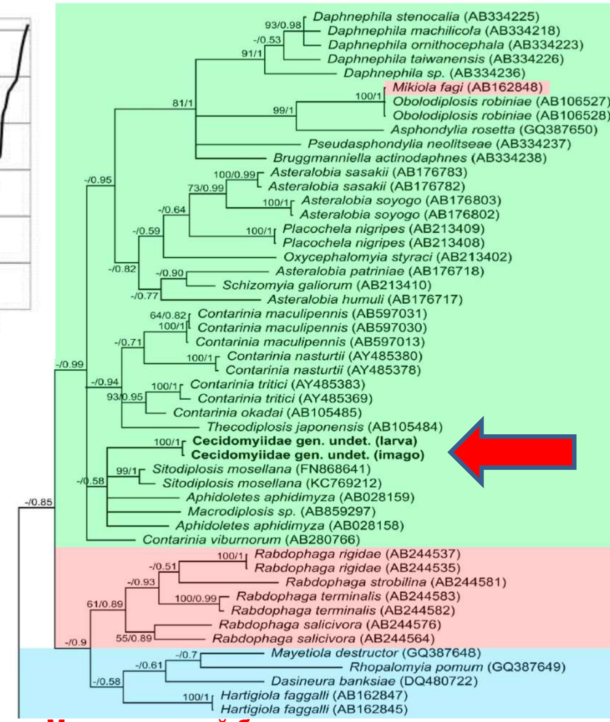












Молекулярный баркодинг личинок и имаго опылителей *Aspidistra xuansonensis*

American Journal of Botany
Celebrating 100 years 1914–2014

American Journal of Botany 101(9): 1519–1531, 2014.

Pollination of Vietnamese *Aspidistra xuansonensis* (Asparagaceae) by female Cecidomyiidi flies: Larvae of pollinator feed on fertile pollen in anthers of anthetic bisexual flowers[1]

Nikolay A. Vislobokov[2,3,8], Tatiana V. Galinskaya[4], Galina V. Degtjareva[5], Carmen M. Valiejo-Roman[6], Tahir H. Samigullin[6], Andrey N. Kuznetsov[3,7], and Dmitry D. Sokoloff[2]

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REGULAR PAPER

Two new genera of Podostemaceae from northern Central Laos: saltational evolution and enigmatic morphology

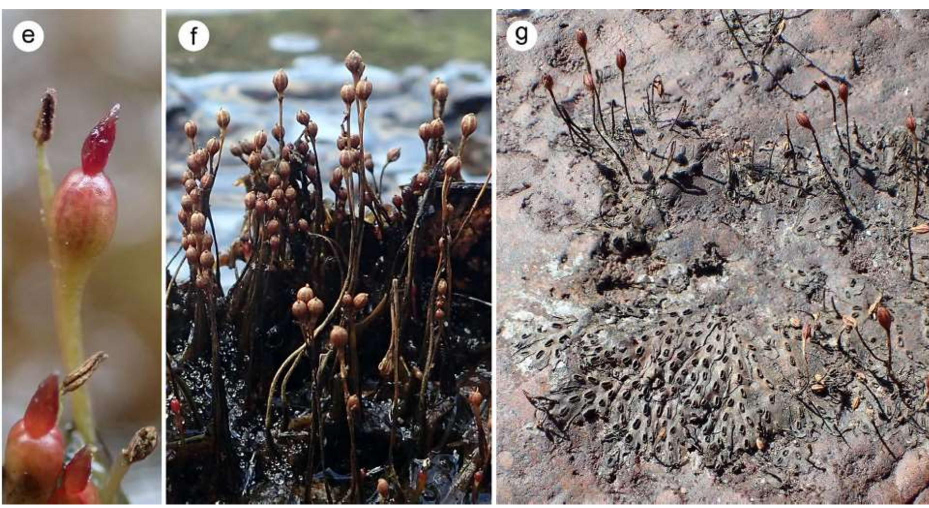
Satoshi Koi[1] · Hyosig Won[2] · Masahiro Kato[3]

Received: 10 March 2018 / Accepted: 9 December 2018

Abstract

Podostemaceae, the river-weeds, are characterized by remarkable differences between species and genera, which resulted from saltational evolution. This paper presents additional cases of such two genera, which are described here from the Phou Khao Khouay National Protected Area in northern Central Laos. Molecular phylogenetic data show that *Ctenobryum mangkonense* (gen. & sp. nov.) is sister to *Hydrodiscus koyamae*, while *Laosia ramosa* (gen. & sp. nov.) is isolated from all Asian genera of subfamily Podostemoideae. *Ctenobryum mangkonense* is distinct from *Hydrodiscus koyamae* in the crustose roots (*versus* rootless in the latter), scattered flowers on the root (*versus* alternate on the shoot), and pectinate bracts (*versus* simple, sheath-like). *Laosia ramosa* is distinct from all the genera in the columnar, endogenously branched axes and single style-stigma complex. The axis is an enigmatic organ with combined characteristics of root, stem and leaf, pending further study. Laos, together with Thailand, is a center of diversity of the Southeast and East Asian Podostemoideae. The three monotypic genera, i.e., *Ctenobryum, Hydrodiscus* and *Laosia*, occur in neighboring and closely similar aquatic habitats within the Area. The new taxa are formally described.

Keywords *Ctenobryum* · Enigma · *Laosia* · *matK* phylogeny · New genera · Saltational evolution



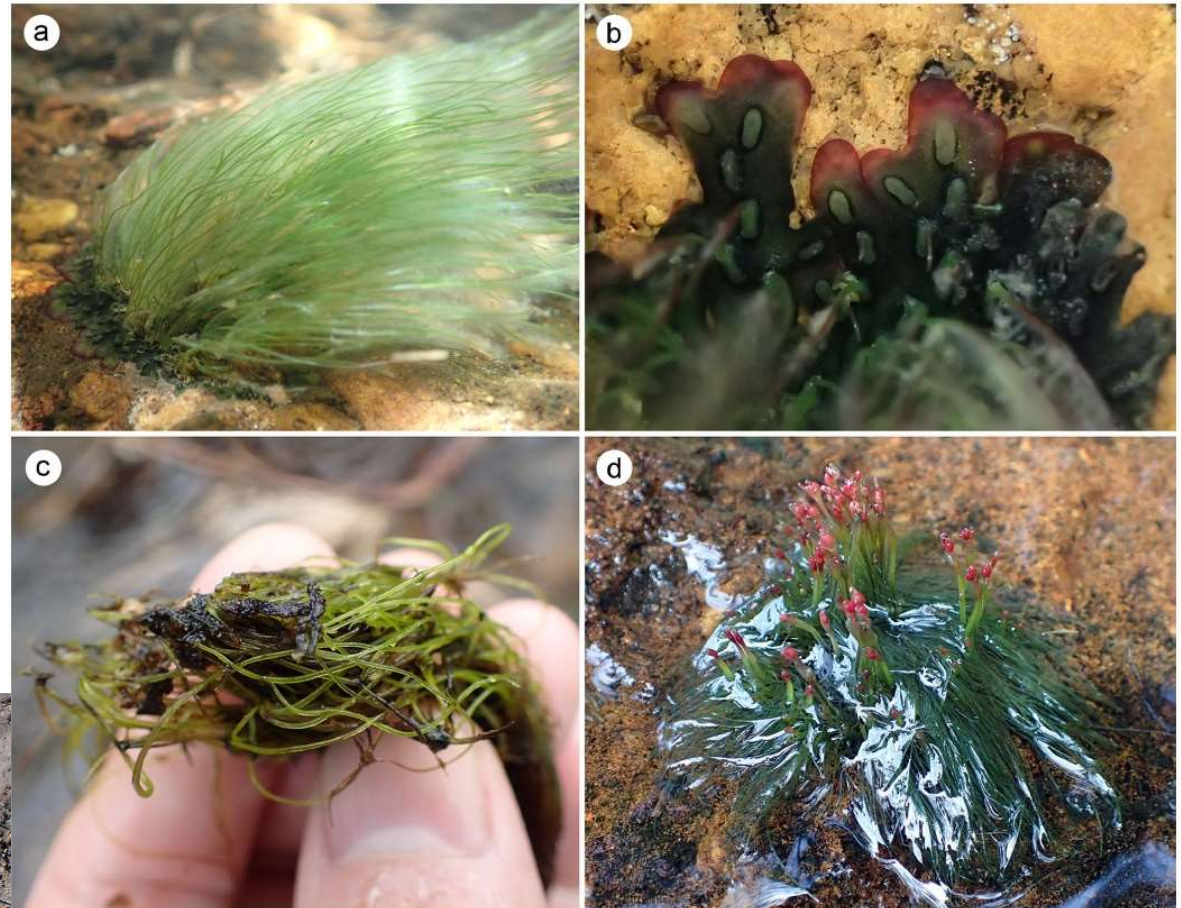
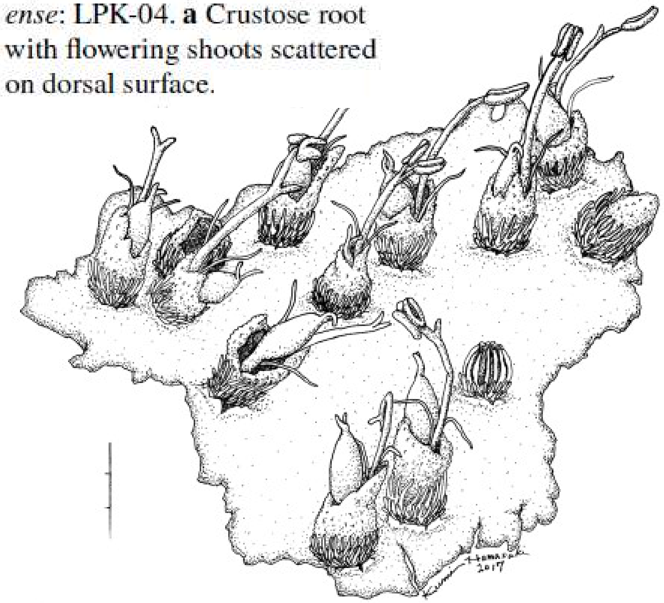
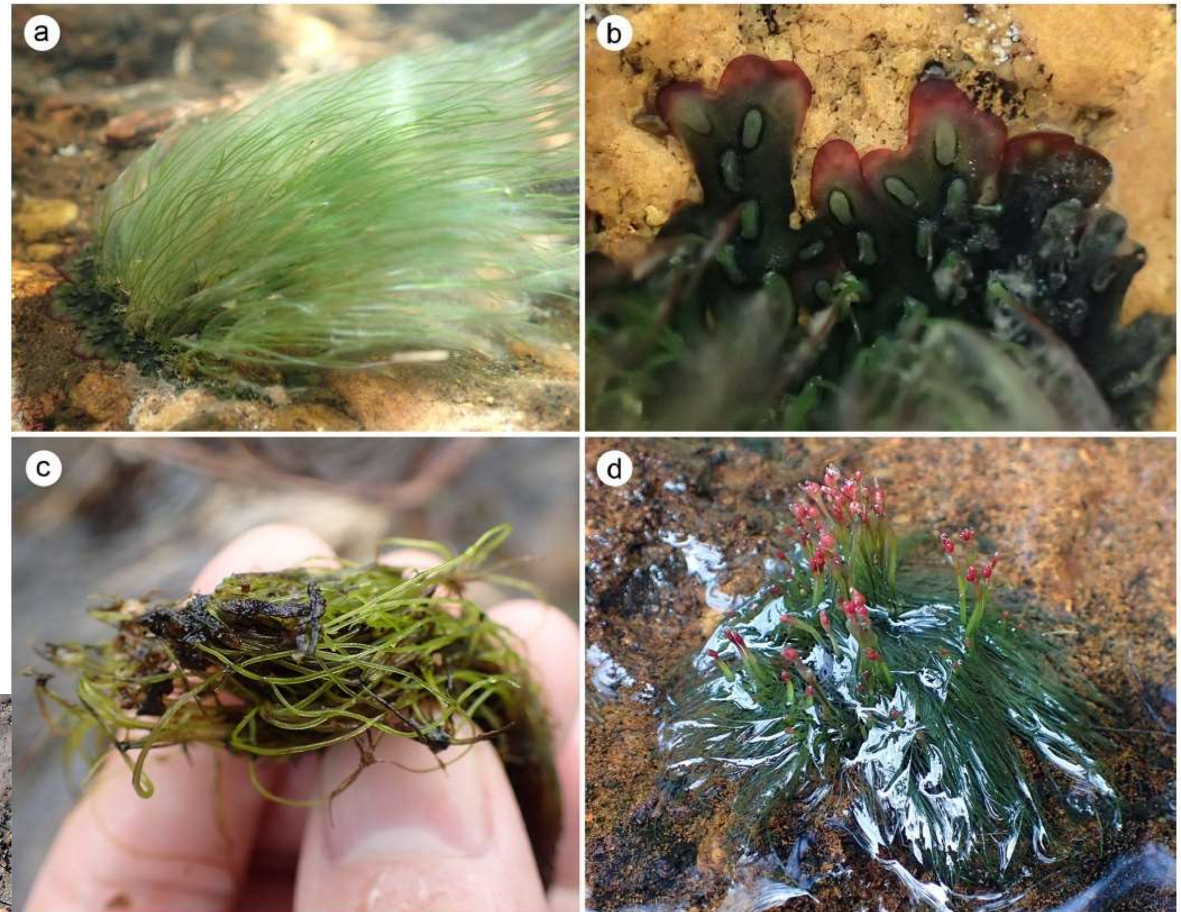


Fig. 3 *Laosia ramosa* in natural habitat. **a** Floating axes branched from roots adhering on rock surface (under water). **b** Lobed, ribbon-like roots. Bulges where axes will arise are seen on root surface (under water). **c** Columnar axes (green) branched from root (black, in upper center). **d** Semi-submerged, floriferous plant. **e** Flower with single stamen and ovary with single stigma. **f** Fruits. **g** Dried roots with fruits. Scars of floriferous branches in depressions on root

Fig. 7 *Ctenobryum mangkonense*: LPK-04. **a** Crustose root with flowering shoots scattered on dorsal surface.





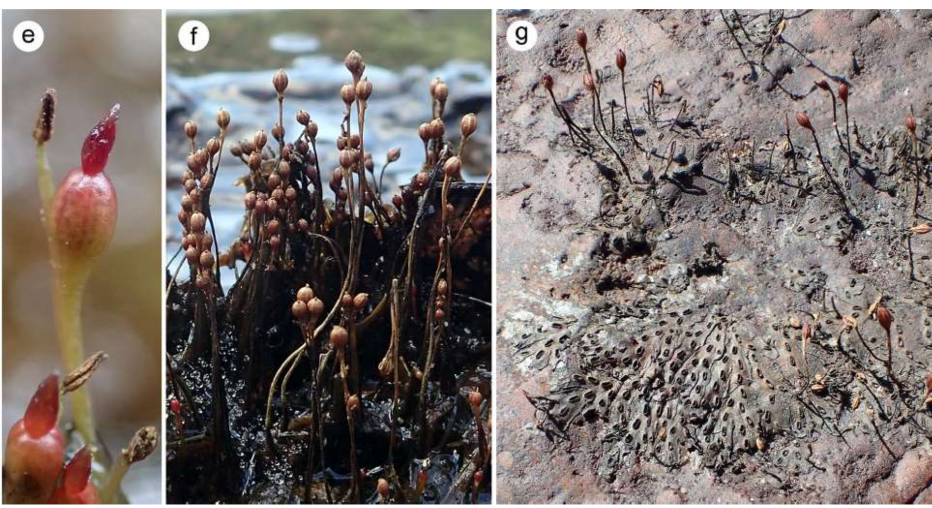


Fig. 3 *Laosia ramosa* in natural habitat. **a** Floating axes branched from roots adhering on rock surface (under water). **b** Lobed, ribbon-like roots. Bulges where axes will arise are seen on root surface (under water). **c** Columnar axes (green) branched from root (black, in upper center). **d** Semi-submerged, floriferous plant. **e** Flower with single stamen and ovary with single stigma. **f** Fruits. **g** Dried roots with fruits. Scars of floriferous branches in depressions on root

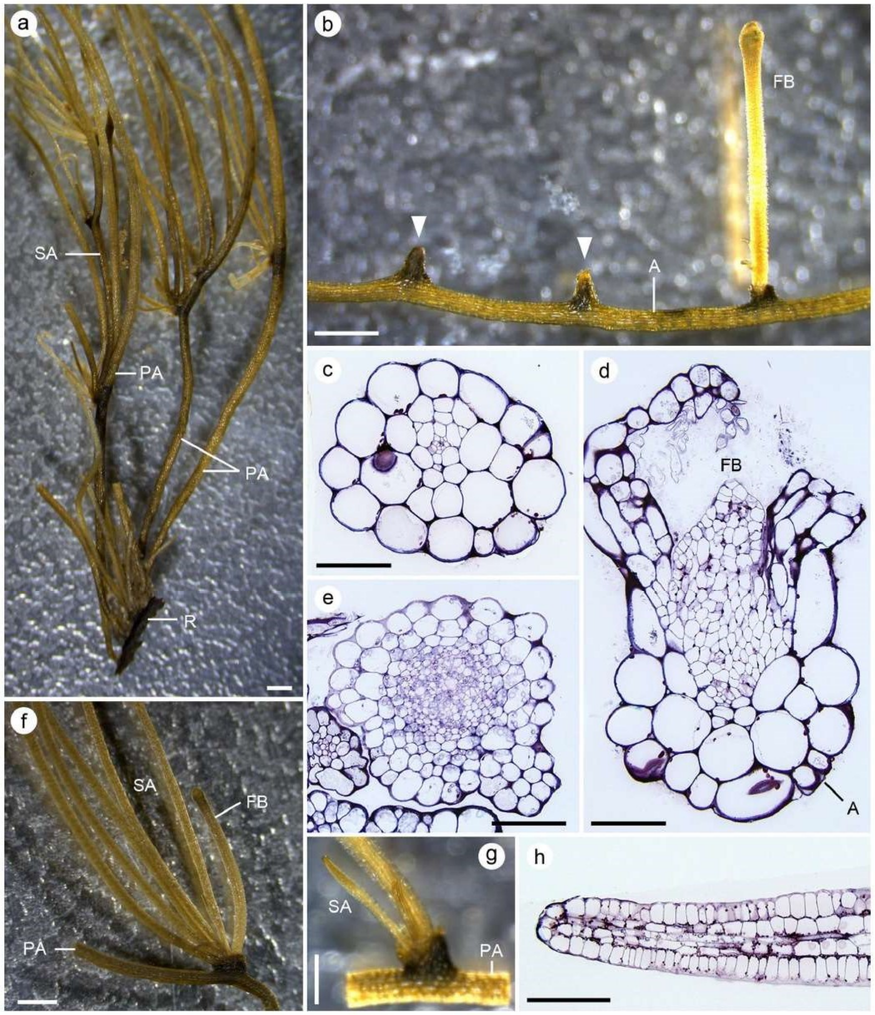


Fig. 4 Axes of *Laosia ramosa*. **a** Branched axes borne on flattened root showing that primary axes arise from root and secondary axes arise from primary ones. **b** Two branch buds (arrowheads) and floriferous branch (= flower bud comprising spathella and elongate pedicel) from parental axis. Note flower buds occur on same side of axis. **c** Cross section of columnar axis with thin provascular cells. **d** Cross section of axis with endogenous bud (in longitudinal section). **e** Cross section of pedicel. **f** Endogenous flower bud and axes (secondary axes) from parental axis (primary axis). **g** Endogenous lateral branches (short axes) subtended by turned-up ruptured projection of axis. **h** Longitudinal section of short axis. *A* axis, *FB* flower bud, *PA* primary/parental axis, *R* root (flattened), *SA* secondary axis. *Scale bars* **a, b, f** 1 mm; **c–e, h** 100 µm; **g** 500 µm

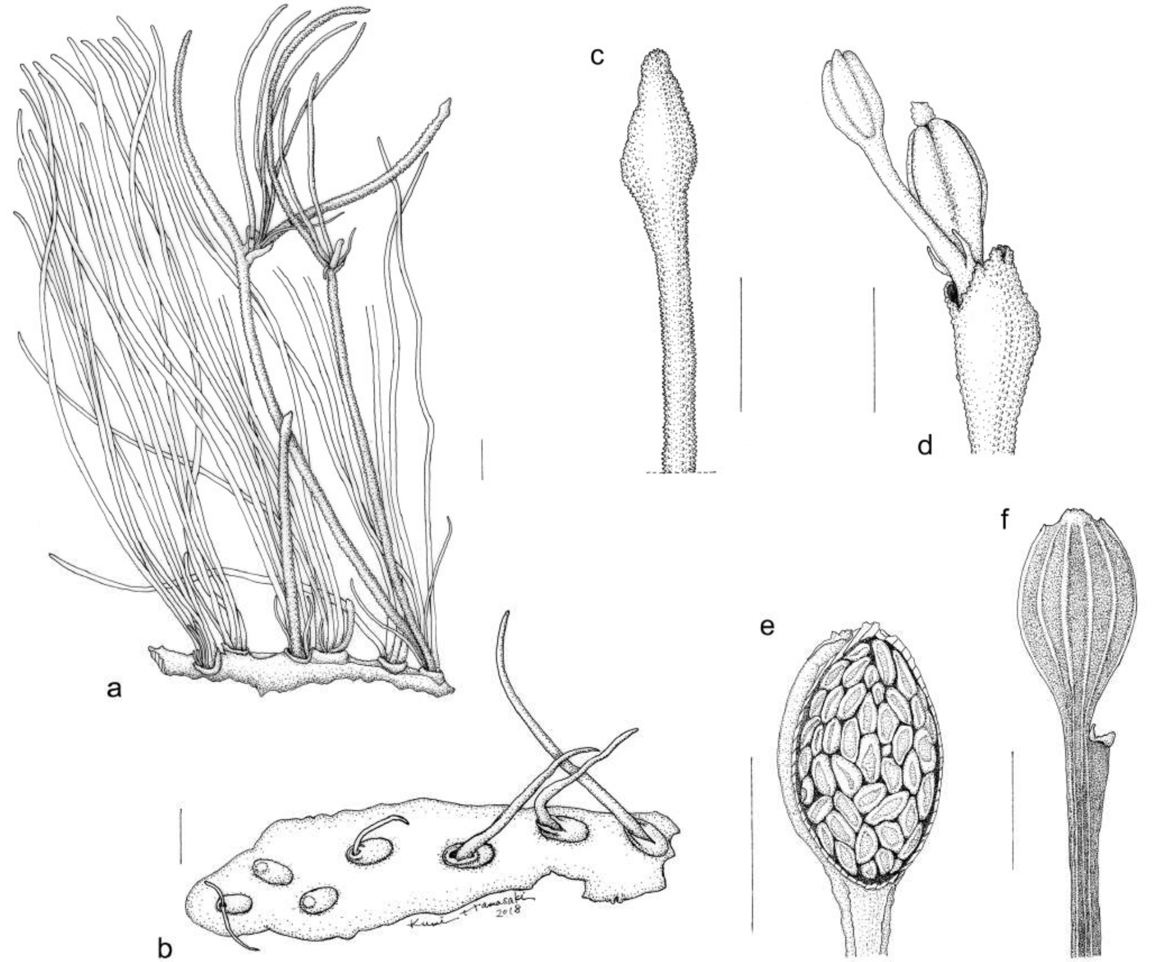


Fig. 8 *Laosia ramosa*: **a** LPK-206, **b** LPK-201, **c–f** LPK-05. **a** Branched columnar axes, some of which are floriferous, branched from ribbon-like root. **b** Ribbon-like root with axis-buds on dorsal surface. **c** Spathella. **d** Flower extruded from spathella, with two tepals, single stamen and ovary with single stigma. **e** Seeds on placenta in capsule. Valve of capsule is removed. **f** Stalked, ribbed capsule. *Scale bars* 1 mm

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Vladimariales ordo nov. (Gymnospermae) from the Middle Jurassic Deposits of the Mikhailovskii Rudnik Locality (Kursk Region, European Russia)

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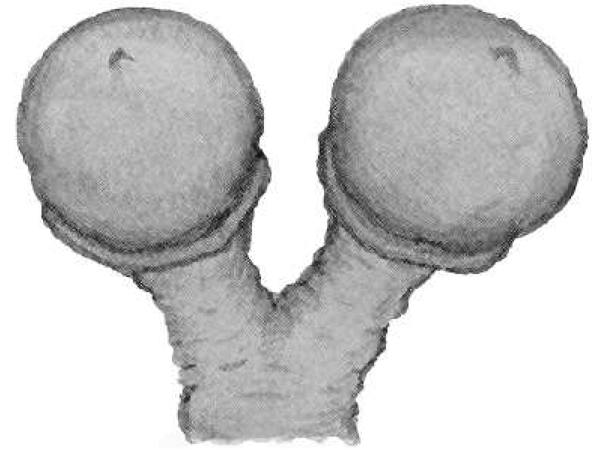
Received: July 14, 2009

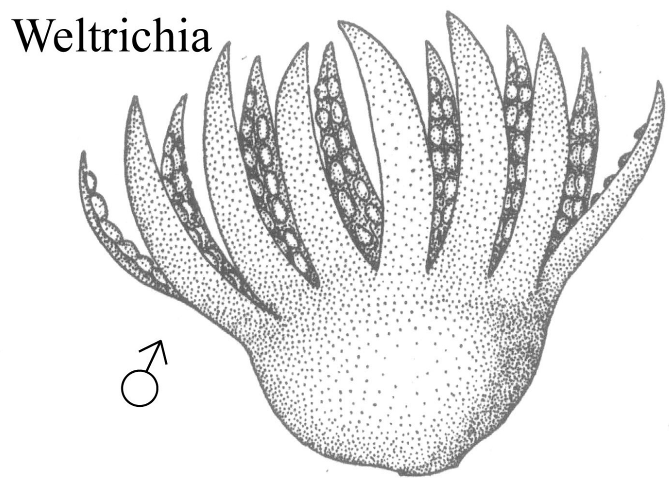
Abstract—Composite seed-bearing capsules (formed by fusion of eight radially arranged elementary capsules), assigned to a new monotypic order Vladimariales ordo nov., were found in the Upper Bathonian deposits of the Mikhailovskii rudnik locality (Zheleznogorsk town, Kursk Region). In its morphology, the new order demonstrates valuable, phylogenetically conditioned similarity to Peltaspermales and Umkomasiales, but it is evolutionarily more advanced than these latter. A base of the composite capsule is supported by a collar on a stalk, which in external appearance is not different from collar of Ginkgo L., but has stalk, vascularized in a different way (its conducting tissue consisted of eight radially arranged collateral vascular bundles; each vascular bundle correspond to one of eight fused elementary capsules, each of which contain a solitary seed). Capsules and seeds are inverted relative to the collar; as a result, collar protects micropilar tips of seeds. The presence of collar and whole aspect of the new plant composite capsules give them the significant superficial similarity with seed-bearing organs of modern Ginkgo. Mature composite capsule in Vladimariales ordo nov. dehisced along the lines of fusion of elementary capsules, forming the composite capsule, and scattered seeds; opened composite capsule detached from axis. The significance of the new order for gymnosperm phylogeny is discussed.

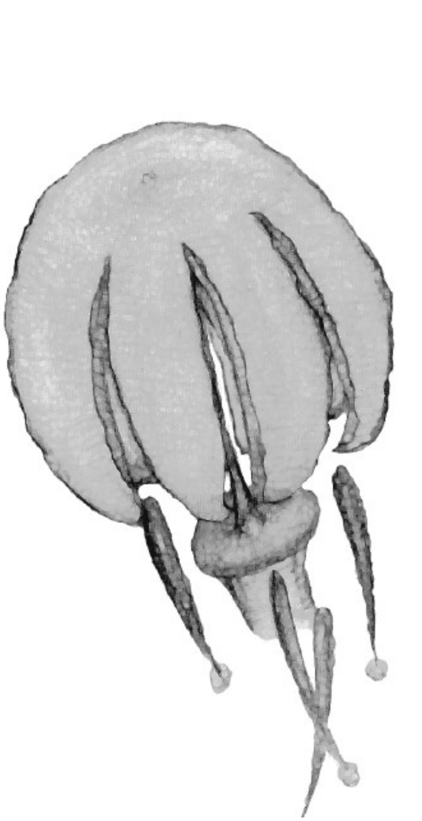
Key words: Middle Jurassic, Bathonian, gymnosperms, Ginkgoopsida, morphology, anatomy, systematics.
DOI: 10.1134/S0031030110100060

Czekanowskiales. He regarded the corystosperms (umkomasians) as a family within the order Peltaspermales. In recent years, they are often regarded as a separate order–Umkomasiales (Anderson and Anderson, 2003; Taylor et al., 2006; Taylor and Taylor, 2009). I also believe that umkomasians are an independent order. Meyen included all listed orders to comprehensive classis Ginkgoopsida, erected for plants with bilaterally symmetrical seeds without secondary integument (Meyen, 1984, 1987). He derived the Caytoniales, Ginkgoales, and Czekanowskiales directly from Peltaspermales with their umbrella-shaped seed-bearing organs, through the family Angaropeltidaceae (a new name of Cardiolepidaceae, established by Meyen, 1977). The Peltaspermales (I exclude of them umcomasians), evidently, appeared already in the Carboniferous (Kerp et al., 2001; Naugolnykh, 2007), still demonstrated diversity in the Triassic, but completely disappeared to the beginning of Jurassic. According to Meyen, the Ginkgoales and Czekanowskiales are united by close affinity to Peltaspermales. The vast majority of foreign scientists at present



Reconstructed premature composite capsules of *Vladimaria octopartita*





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Vladimariales ordo nov. (Gymnospermae) from the Middle Jurassic Deposits of the Mikhailovskii Rudnik Locality (Kursk Region, European Russia)

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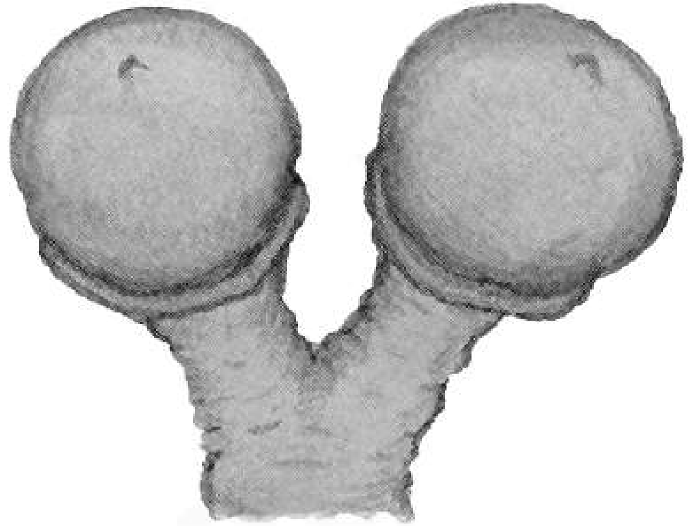
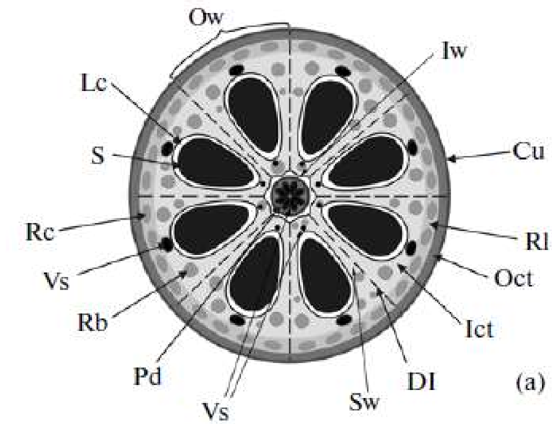
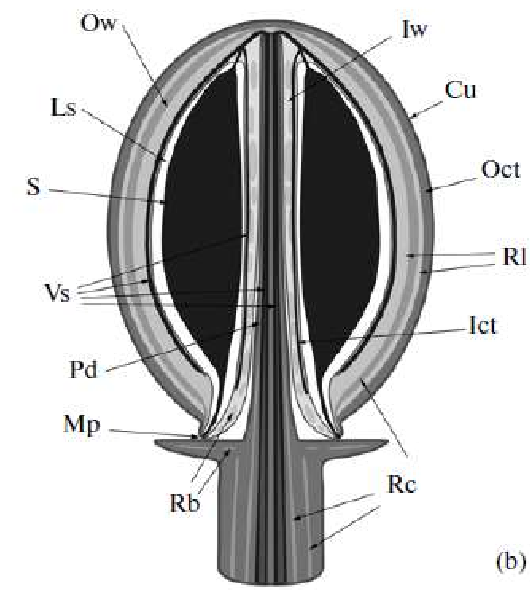
Received: July 14, 2009

Abstract—Composite seed-bearing capsules (formed by fusion of eight radially arranged elementary capsules), assigned to a new monotypic order Vladimariales ordo nov., were found in the Upper Bathonian deposits of the Mikhailovskii rudnik locality (Zheleznogorsk town, Kursk Region). In its morphology, the new order demonstrates valuable, phylogenetically conditioned similarity to Peltaspermales and Umkomasiales, but it is evolutionarily more advanced than these latter. A base of the composite capsule is supported by a collar on a stalk, which in external appearance is not different from collar of Ginkgo L., but has stalk, vascularized in a different way (its conducting tissue consisted of eight radially arranged collateral vascular bundles; each vascular bundle correspond to one of eight fused elementary capsules, each of which contain a solitary seed). Capsules and seeds are inverted relative to the collar; as a result, collar protects micropilar tips of seeds. The presence of collar and whole aspect of the new plant composite capsules give them the significant superficial similarity with seed-bearing organs of modern Ginkgo. Mature composite capsule in Vladimariales ordo nov. dehisced along the lines of fusion of elementary capsules, forming the composite capsule, and scattered seeds; opened composite capsule detached from axis. The significance of the new order for gymnosperm phylogeny is discussed.



Reconstructed premature composite capsules of *Vladimaria octopartita*

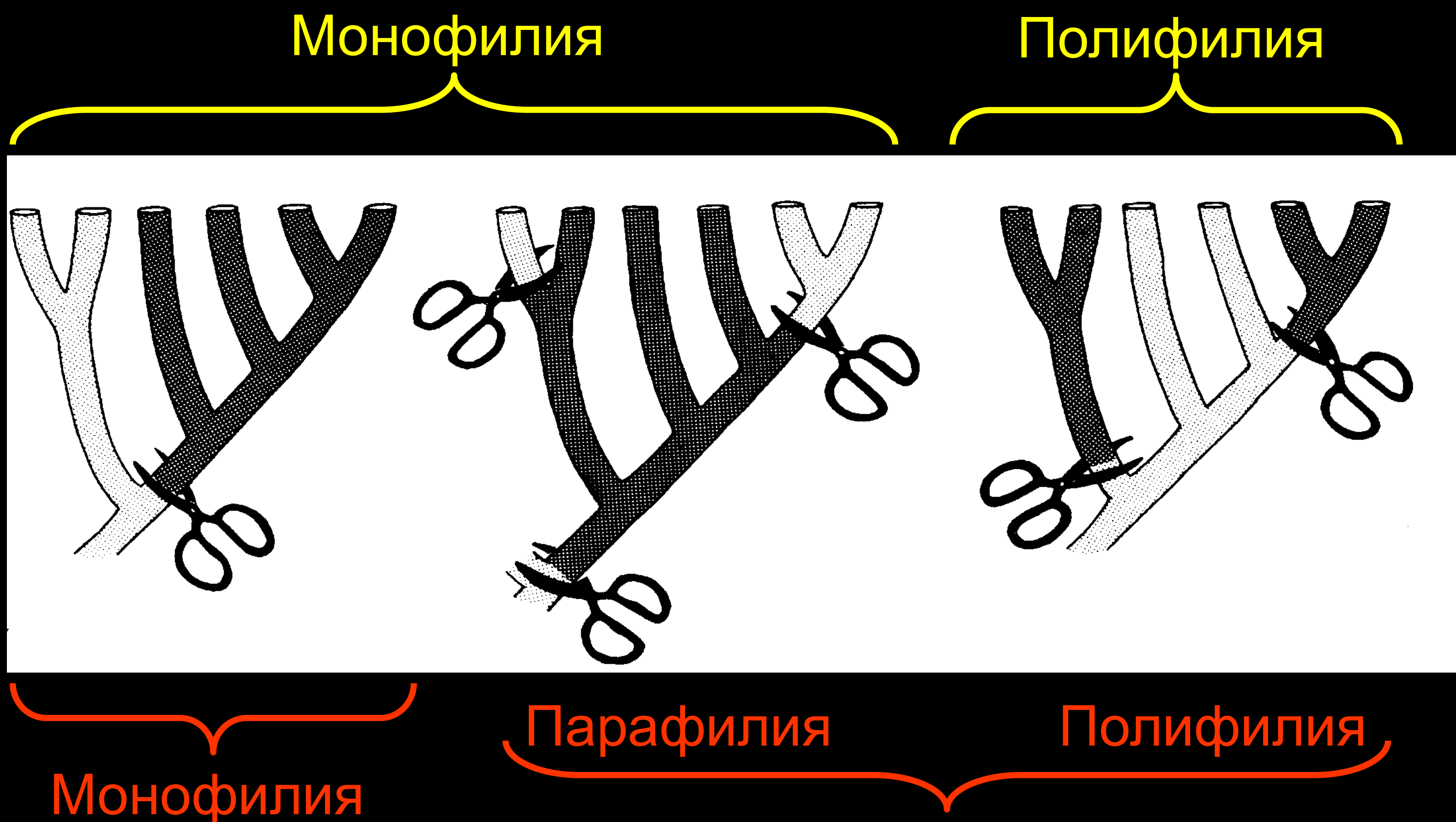




Типы систем живых организмов

- Искусственные – произвольный выбор небольшого числа признаков как основы системы
- Естественные – анализ большого числа признаков и выделение самых значимых как результат работы систематика; попытка отразить в системе «естественно присущий природе порядок» (который мог пониматься, например, как план творения).
- Эволюционные – система должна отражать представления об эволюции
- Кладистические – система должна однозначно следовать из представлений об эволюции. Два аспекта – переход от филогенетического дерева к системе и технические алгоритмы построения деревьев.

Старое понимание терминов

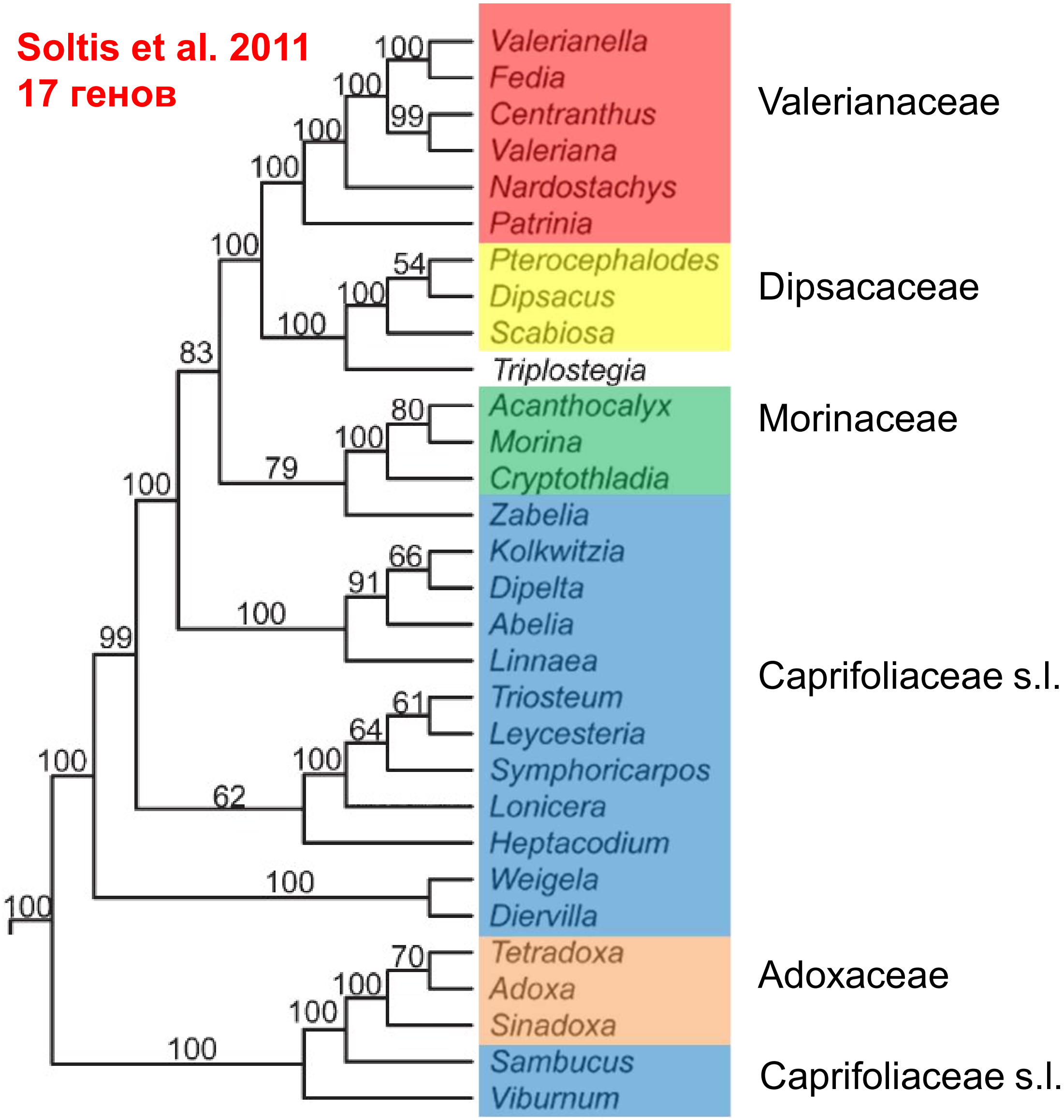


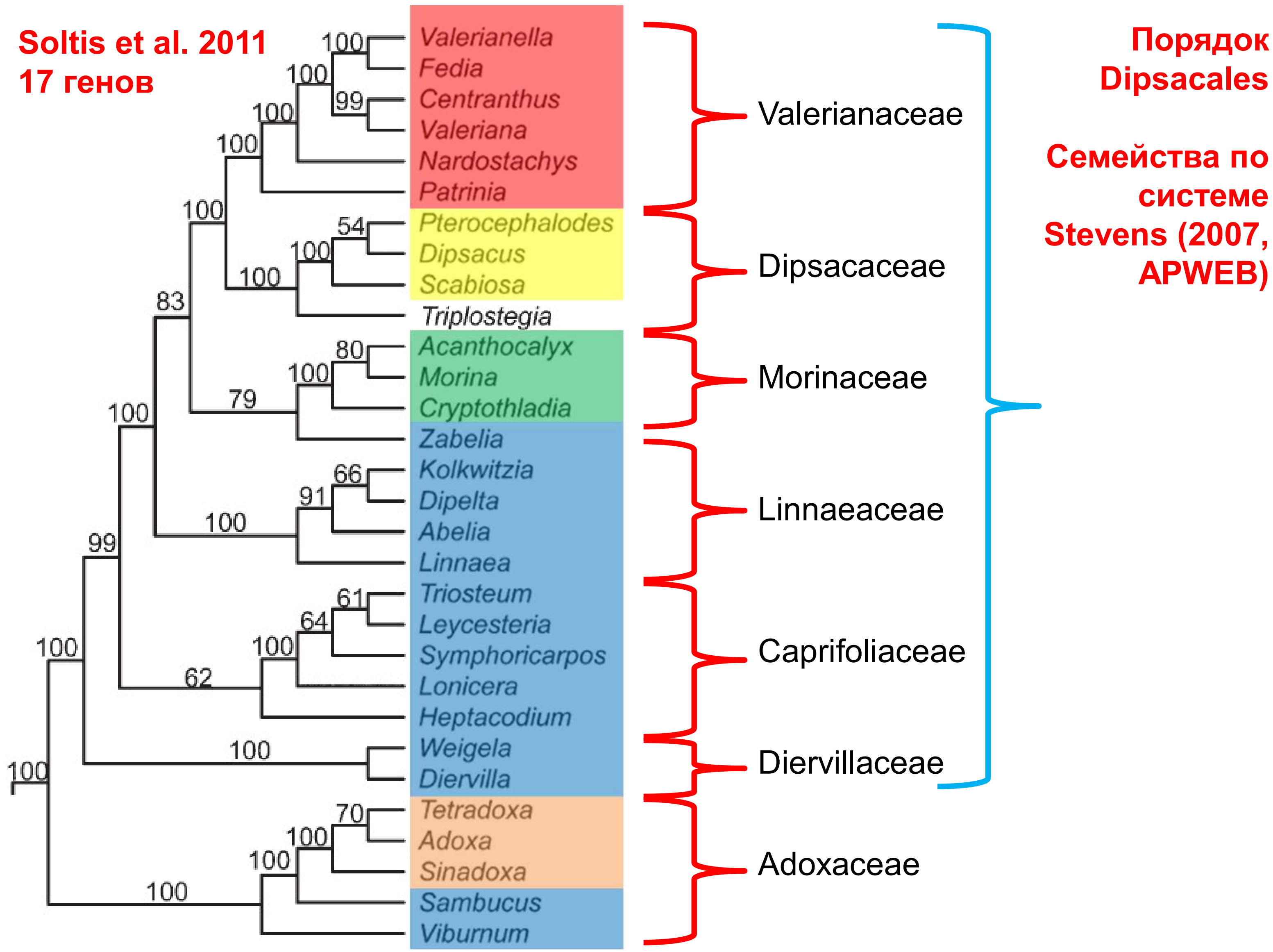
Кладистическое понимание терминов

Soltis et al. 2011
17 генов

Порядок Dipsacales

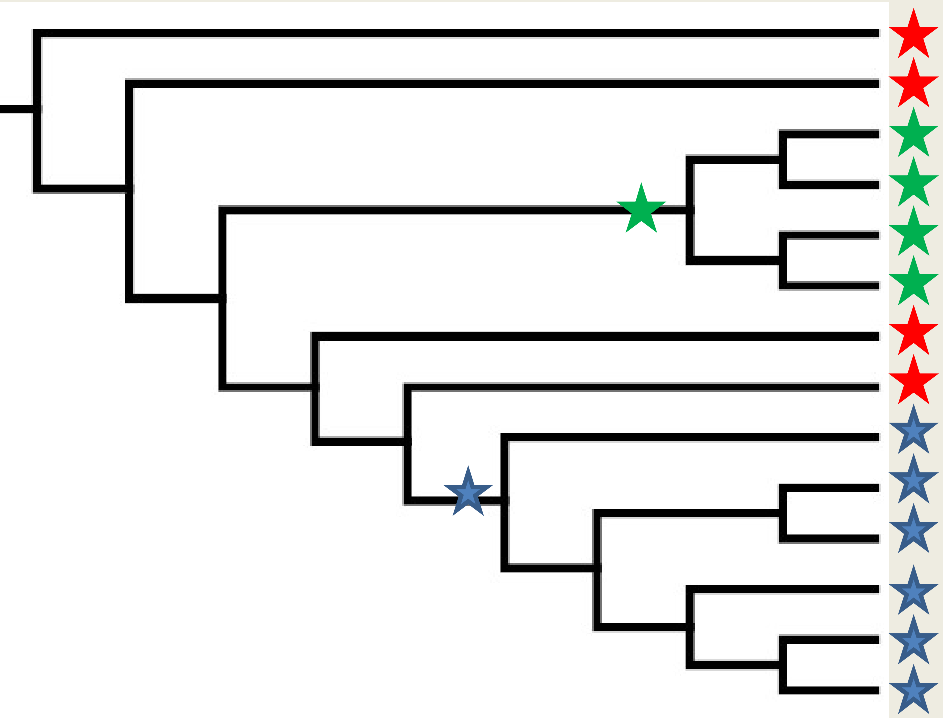
Традиционно выделяемые семейства




Soltis et al. 2011
17 генов
Valerianella
Fedia
Centranthus
Valeriana
Nardostachys
Patrinia
Pterocephalodes
Dipsacus
Scabiosa
Triplostegia
Acanthocalyx
Morina
Cryptothladia
Zabelia
Kolkwitzia
Dipelta
Abelia
Linnaea
Triosteum
Leycesteria
Symphoricarpos
Lonicera
Heptacodium
Weigela
Diervilla
Tetradoxa
Adoxa
Sinadoxa
Sambucus
Viburnum
Valerianaceae
Dipsacaceae
Morinaceae
Linnaeaceae
Caprifoliaceae
Diervillaceae
Adoxaceae
Порядок
Dipsacales
Семейства по
системе
Stevens (2007,
APWEB)

Кладизм,
или «филогенетическая систематика»

- W. Hennig (1950, 1966) – основатель кладизма
- монофилия – парафилия – полифилия
- признаки – состояния признаков
- апоморфные и плезиоморфные состояния признаков
- синапоморфии и симплезиоморфии
- использование внешней группы
- принцип максимальной экономии (парсимонии)

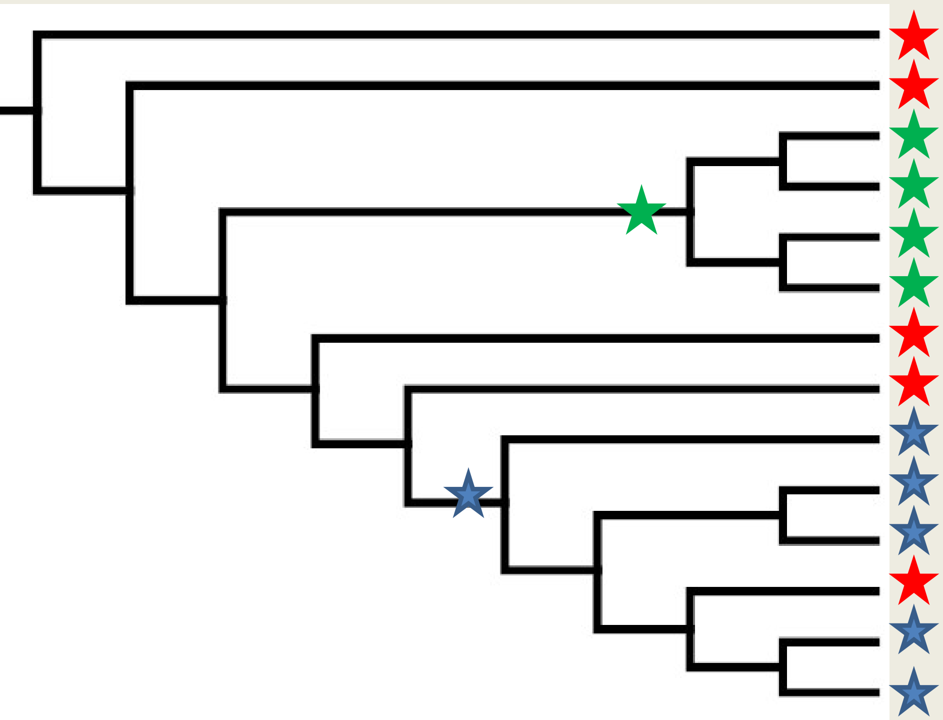


Родство определяют только по апоморфиям!!!

Самое простое предположение, что они возникли у общего предка группы и именно поэтому характерны для его потомков (т.к. унаследованы от этого предка).

Апоморфия – производное состояние признака

Плесиоморфия – исходное состояние признака

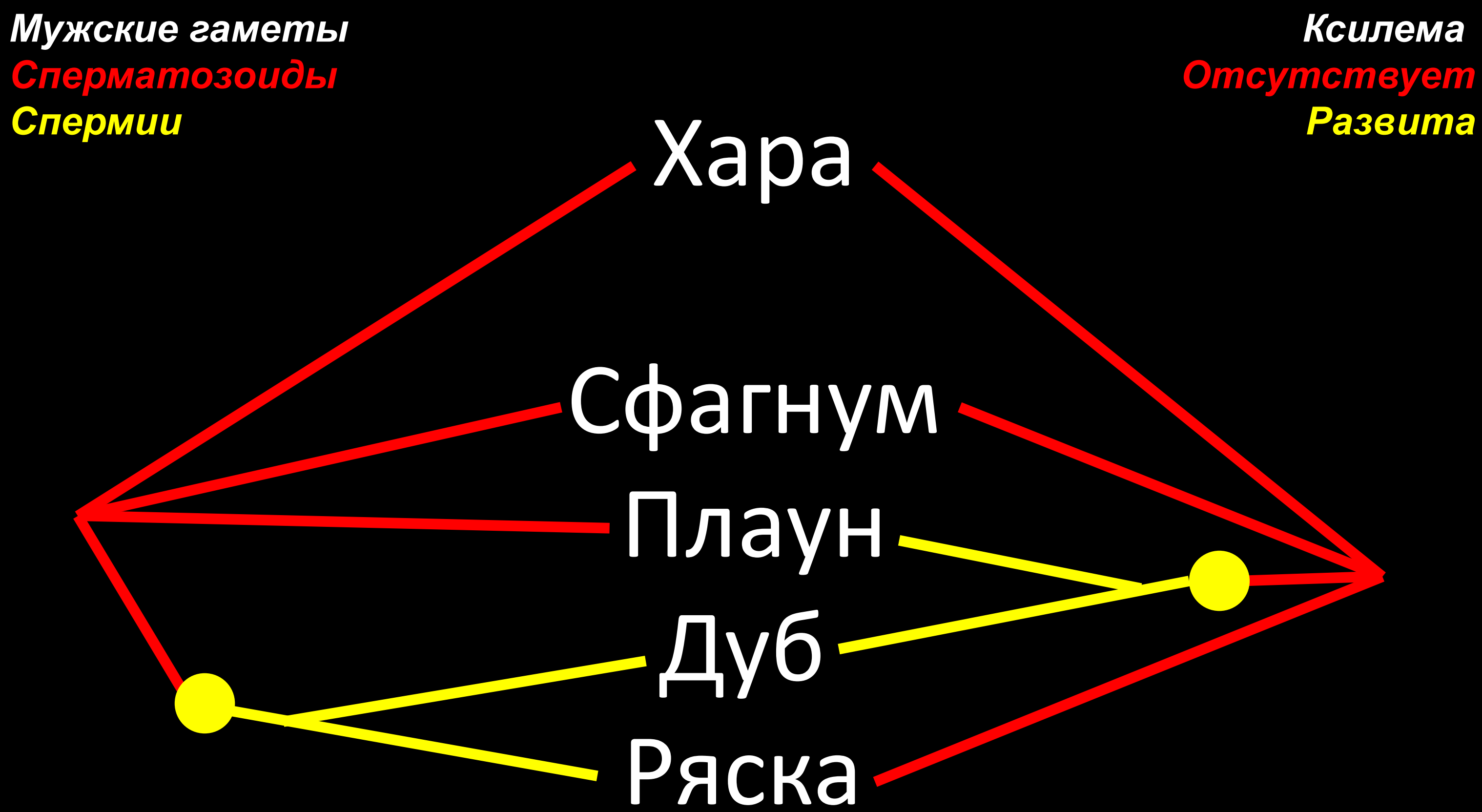


Родство определяют только по апоморфиям!!!

Самое простое предположение, что они возникли у общего предка группы и именно поэтому характерны для его потомков (т.к. унаследованы от этого предка).

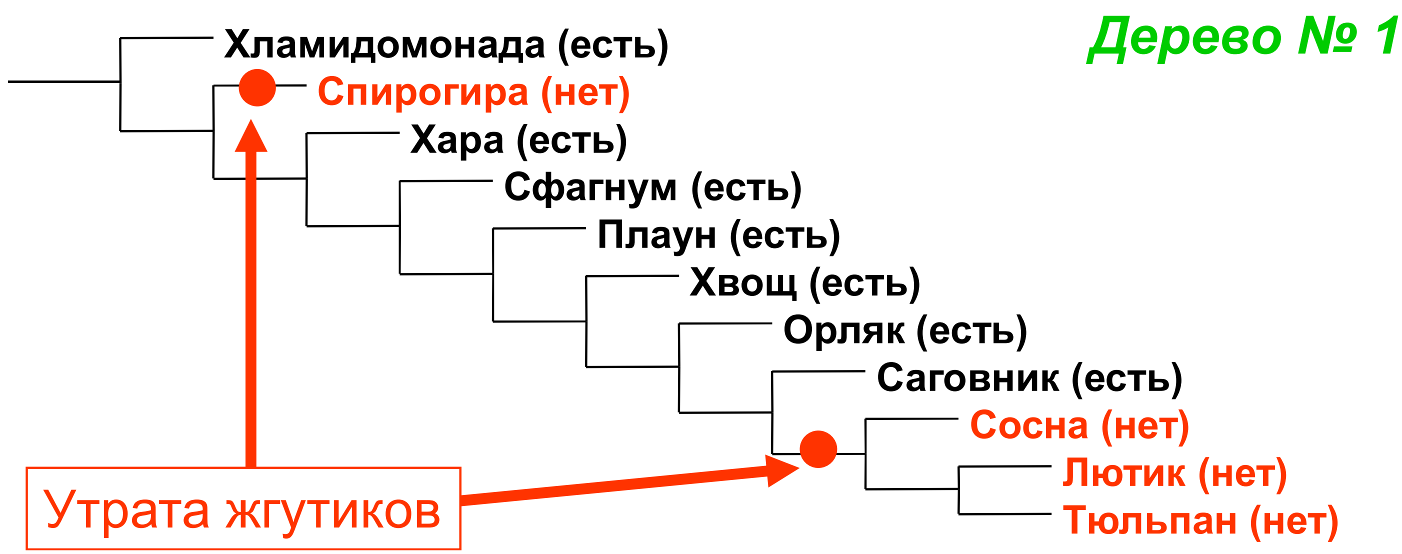
Апоморфия – производное состояние признака

Плезиоморфия – исходное состояние признака



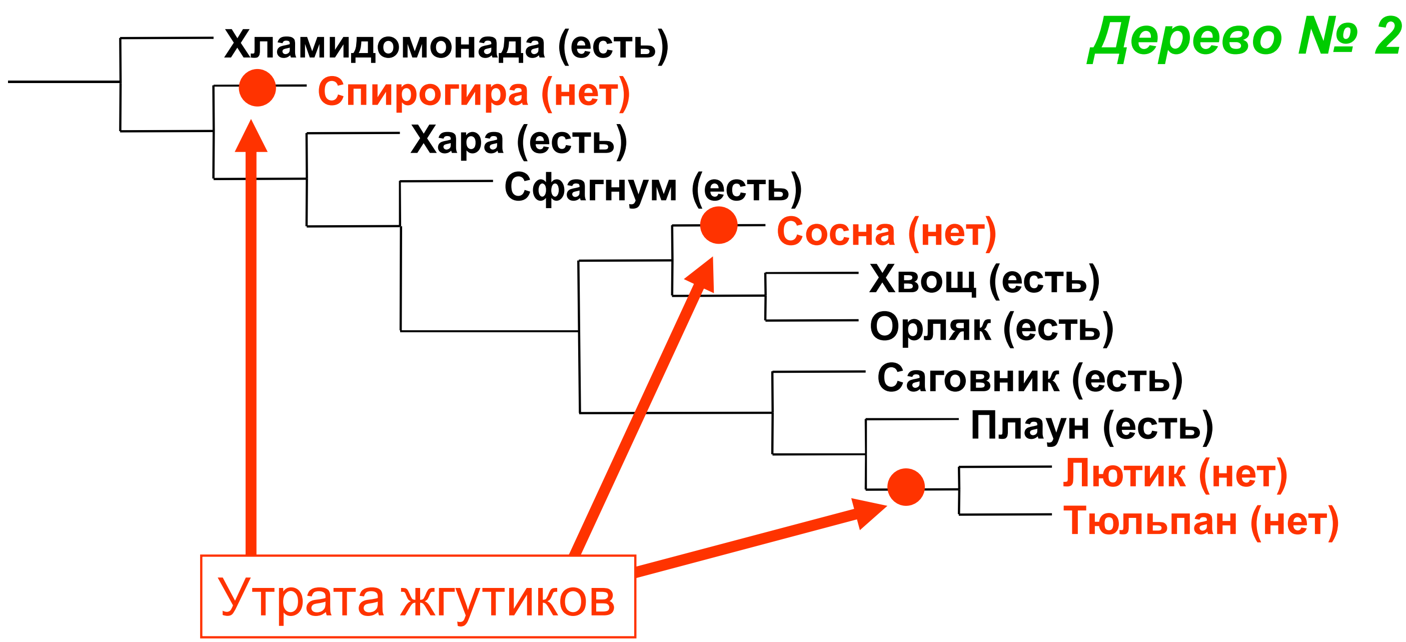
Конфликт признаков: в этом массиве данных две синапоморфии, но не может быть так, что обе они – истинные. Хотя бы одна из них должна быть ложной. Принцип максимальной экономии – один из подходов для принятия решений том, какие из синапоморфий – истинные, а какие – ложные.

Признак № 1: способность образовывать жгутики (есть/нет)



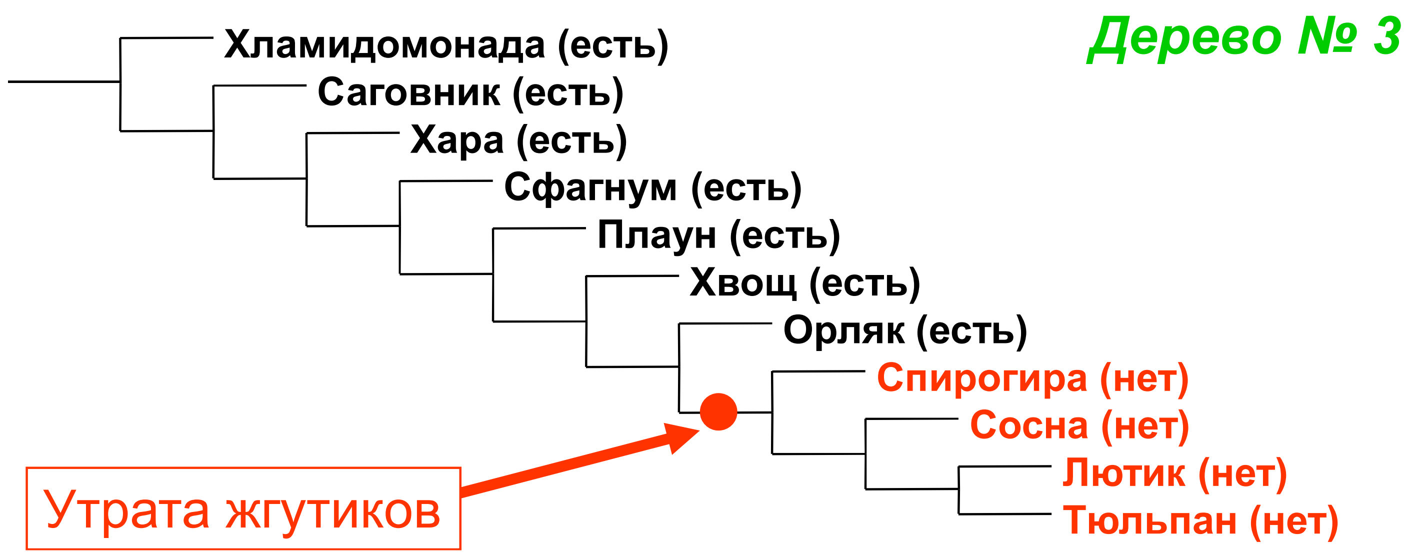
Длина дерева № 1 по признаку № 1 = 2 шага

Признак № 1: способность образовывать жгутики (есть/нет)



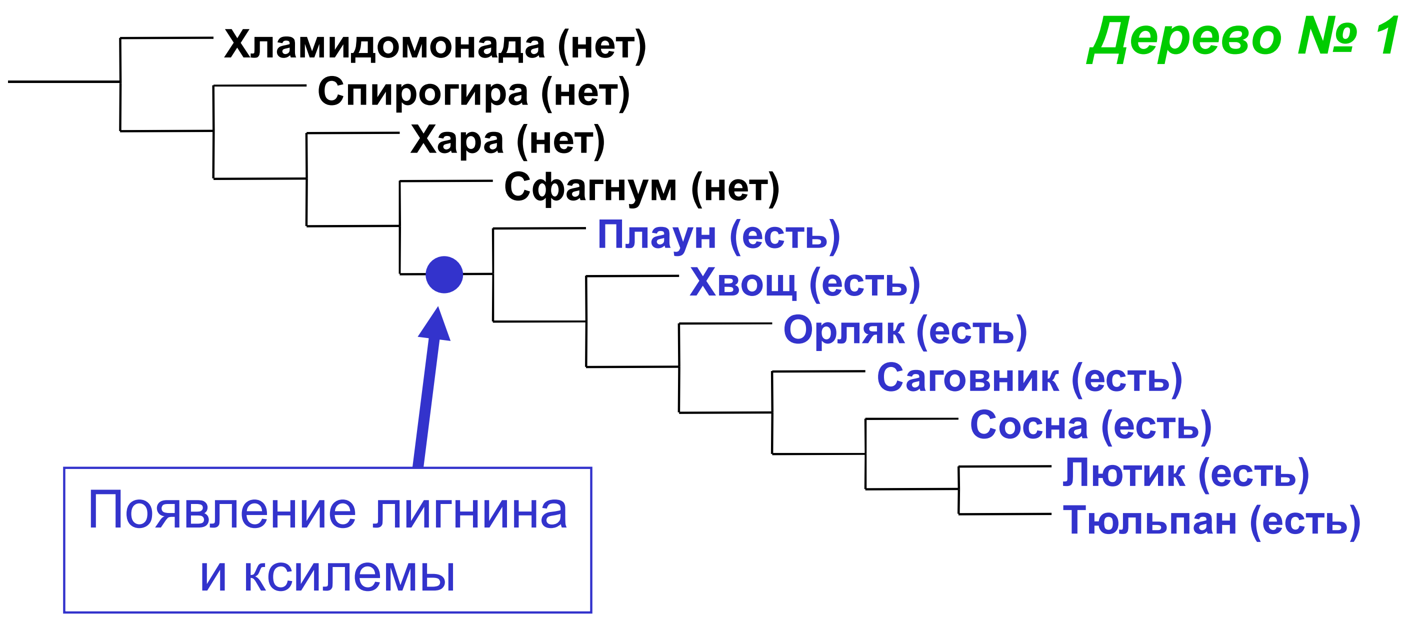
Длина дерева № 2 по признаку № 1 = 3 шага

Признак № 1: способность образовывать жгутики (есть/нет)



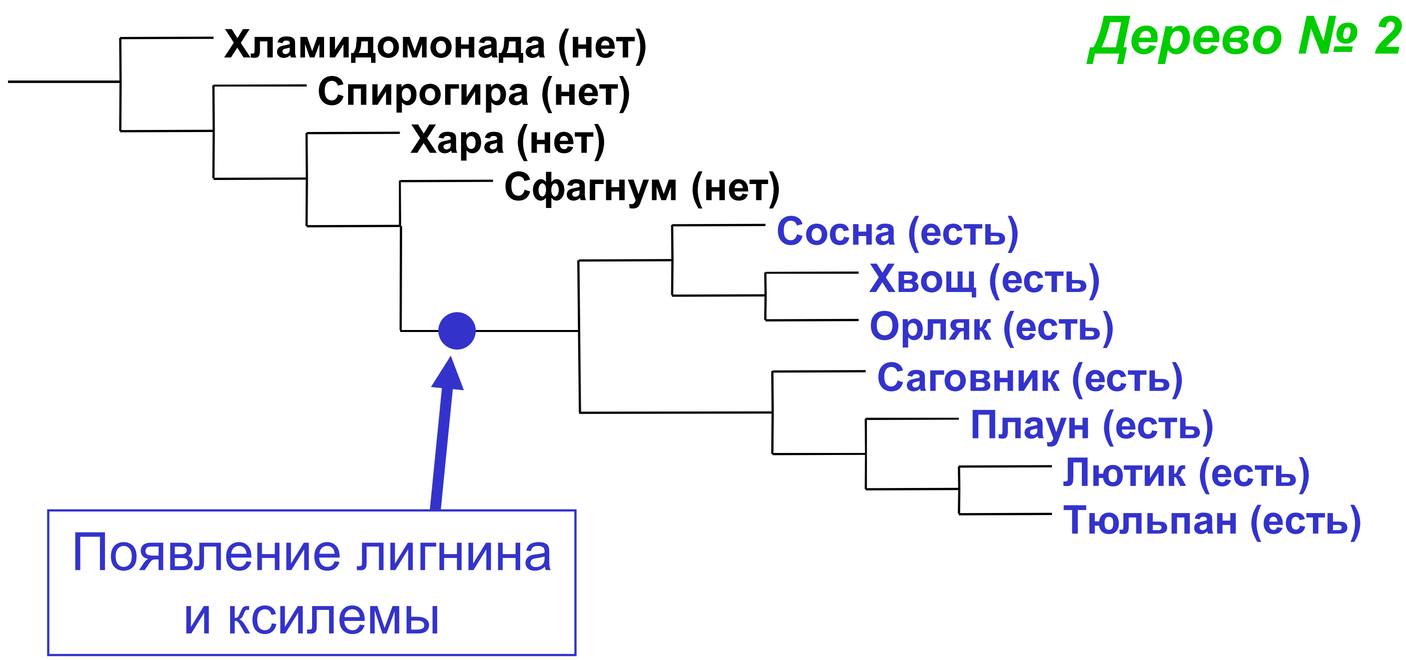
Длина дерева № 3 по признаку № 1 = 1 шаг

Признак № 2: способность к биосинтезу лигнина и наличие проводящих элементов ксилемы (нет/есть)



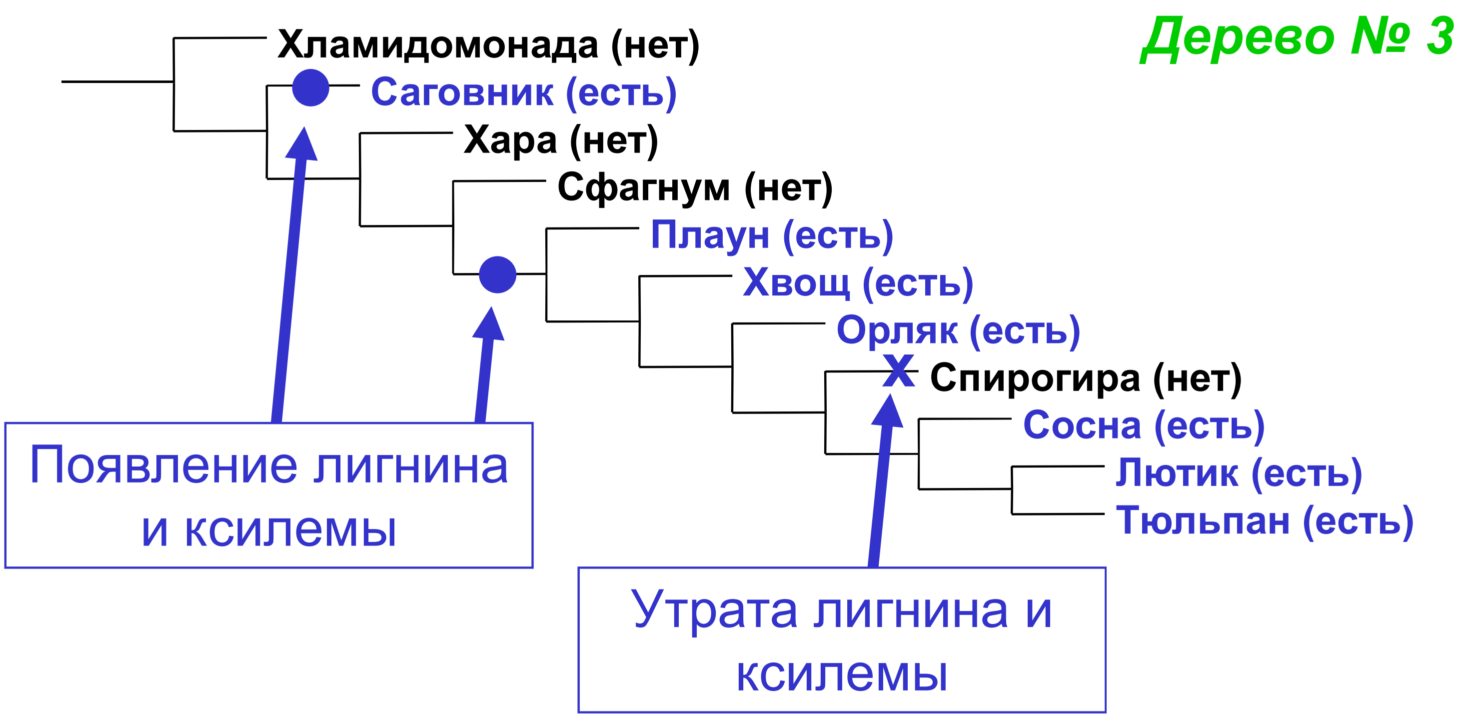
Длина дерева № 1 по признаку № 2 = 1 шаг

Признак № 2: способность к биосинтезу лигнина и наличие проводящих элементов ксилемы (нет/есть)



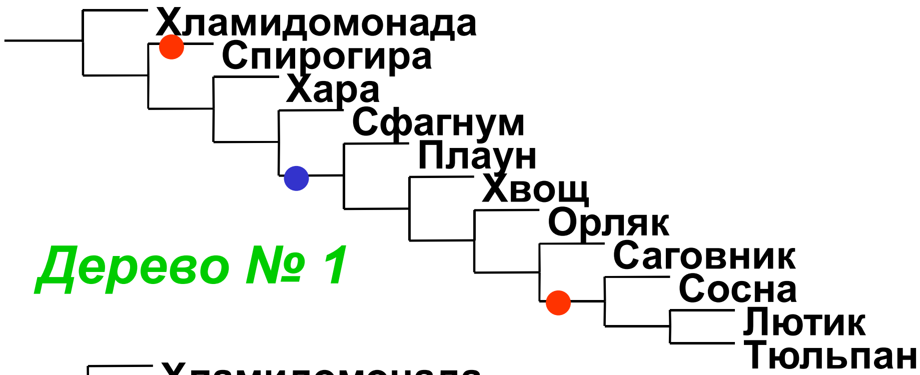
Длина дерева № 2 по признаку № 2 = 1 шаг

Признак № 2: способность к биосинтезу лигнина и наличие проводящих элементов ксилемы (нет/есть)



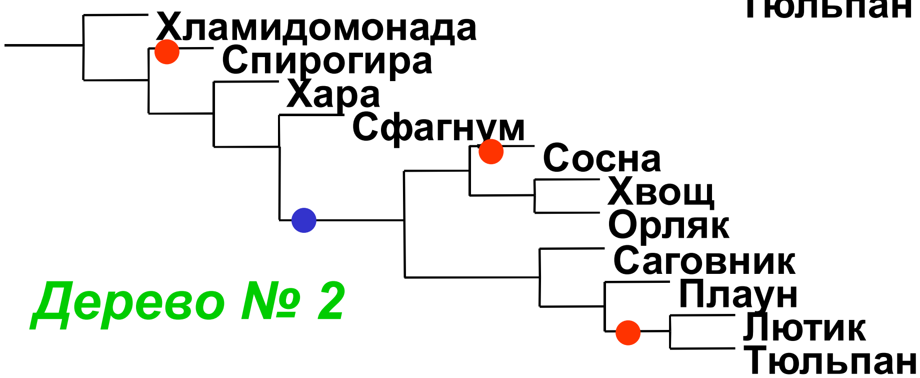
Длина дерева № 3 по признаку № 2 = 3 шага

ДЛИНА ДЕРЕВА



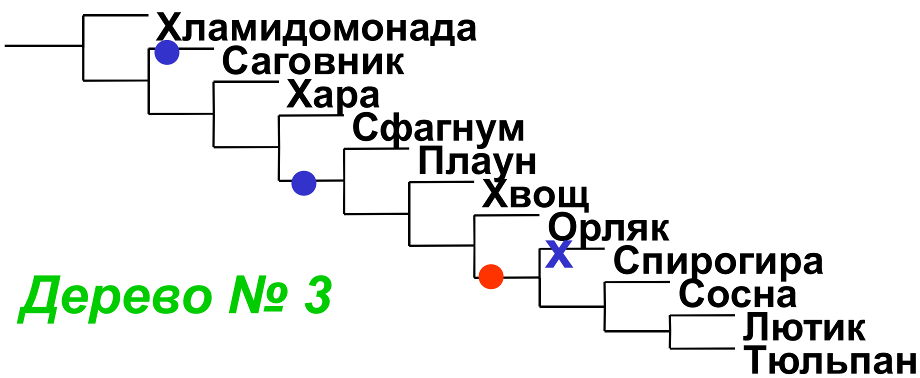
Дерево № 1

$$2 + 1 = 3$$



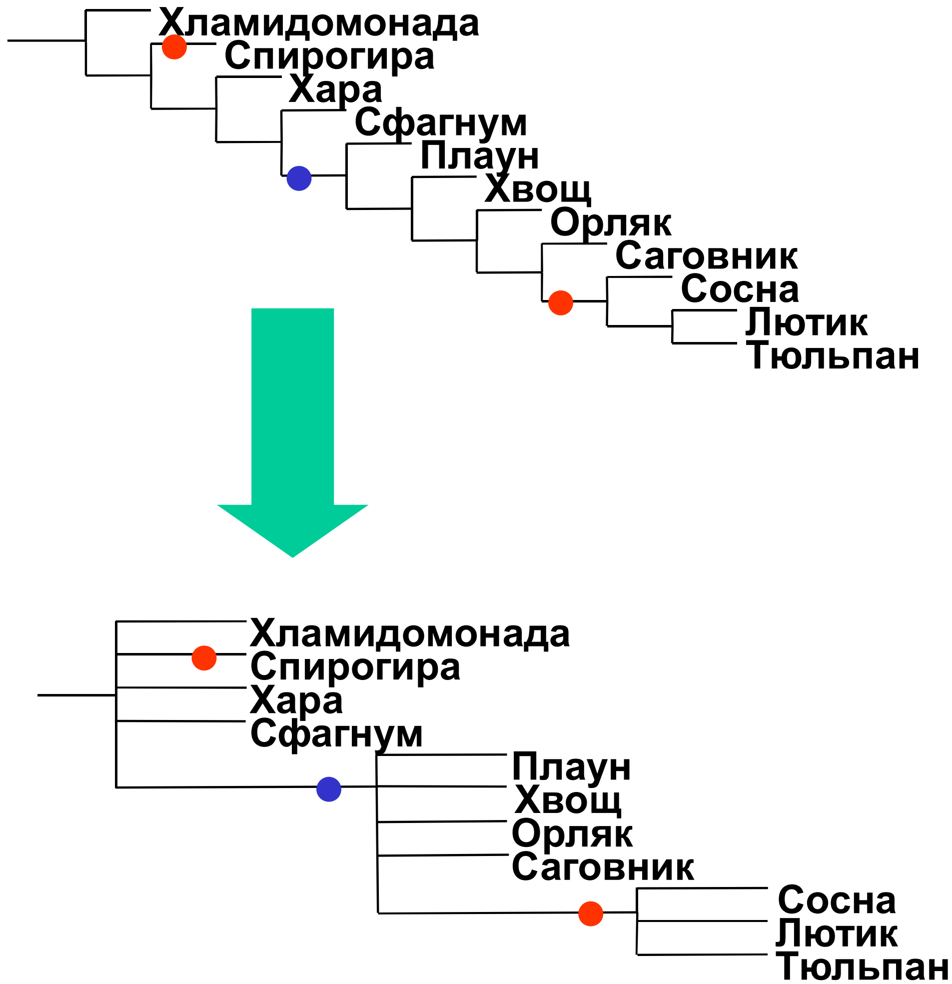
Дерево № 2

$$3 + 1 = 4$$



Дерево № 3

$$1 + 3 = 4$$


Хламидомонада
Спирогира
Хара
Сфагнум
Плаун
Хвощ
Орляк
Саговник
Сосна
Лютик
Тюльпан
Хламидомонада
Спирогира
Хара
Сфагнум
Плаун
Хвощ
Орляк
Саговник
Сосна
Лютик
Тюльпан

Общий вид первичных данных, используемых в молекулярно-филогенетическом анализе

Признак – позиция нуклеотида

Состояние признака – A, T, G, C, наличие/отсутствие

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[2.Kebirita roudairei6GAGAATACCAGATTATA-----GATATTTGTAATCAATCACTGATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
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[4.Hammatolobium lotoiGAGAATACCAGATTATA-----GATATTTGTAATCAATTACTGATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
[5.Acmispon parvifloruGAGAATACCAGATTATA-----GATATTTGTAATCAATCACTGATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGAT-
[6.Cytisopsis pseudocyGAGAATACCAGATTATA-----GATATTTGTAATCAATTACTGATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
[7.Tripodion tetraphylGAGAATACCAGATTATAGTATAGATATTTGTAATCAATCACTGATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
[8.Dorycnopsis abyssinGAGAATACCAGATTATA-----GATATTTGTAATCAATCACTGATCATTTAATTTAGGGGAGGAACA------ATTTAGTATTTCATTGCTACAAATATGGATT
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[36.Anthyllis polycephGAGAATACCAGATTATA-----GATATTTGTAATCAATCACCAATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
[37.Anthyllis onobrychGAGAATACCAGATTATA-----GATATTTGTAATCAATCACCAATCATTTAATTTAGGGGAGGAACA------ATATAGTATTTCATTGCTACAAATATGGATT
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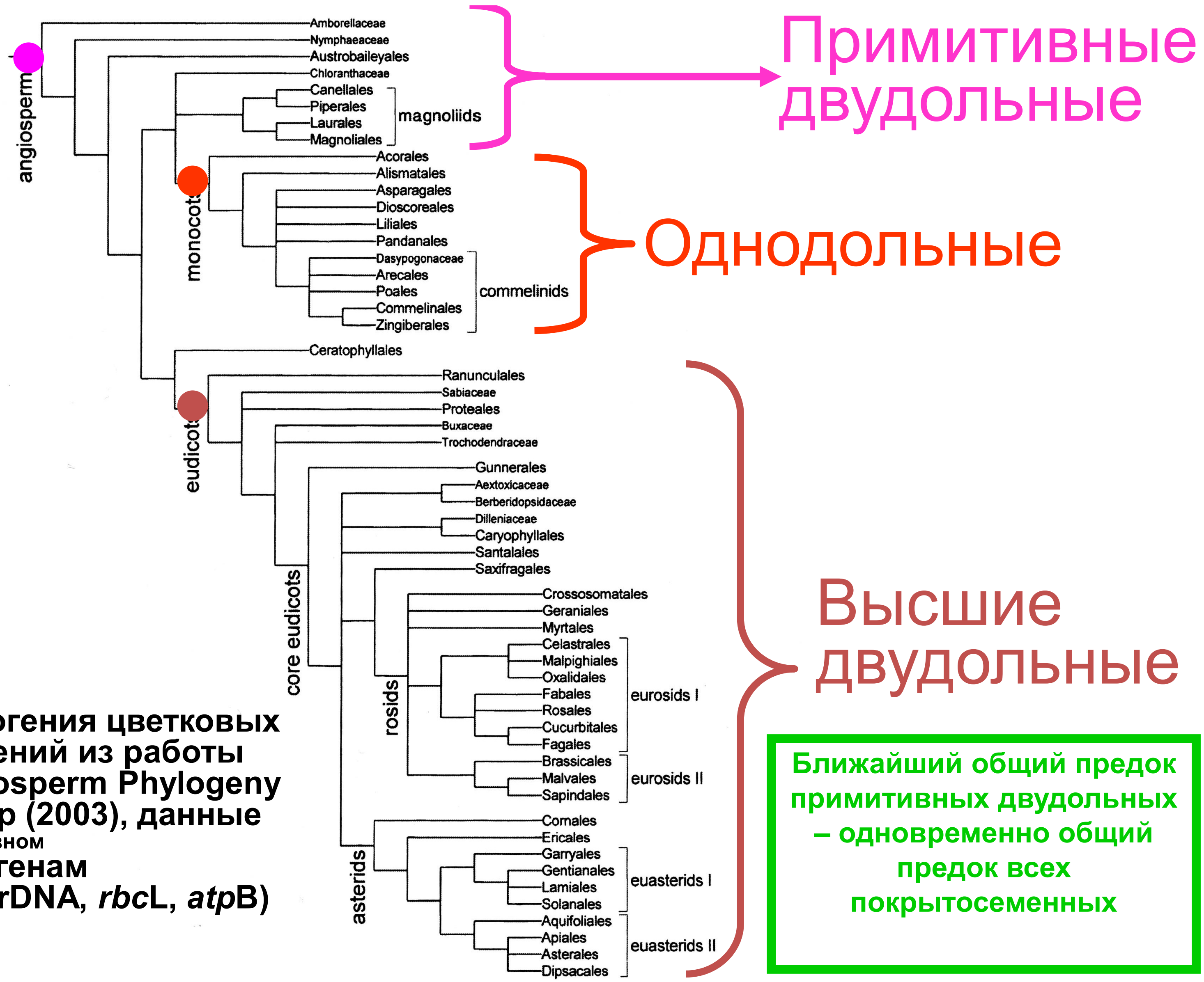


Филогения цветковых растений из работы Angiosperm Phylogeny Group (2003), данные в основном по 3 генам (18S rDNA, *rbc*L, *atp*B)

Ближайший общий предок примитивных двудольных – одновременно общий предок всех покрытосеменных

Филогения покрытосеменных по Hans Hallier (1893-1912)

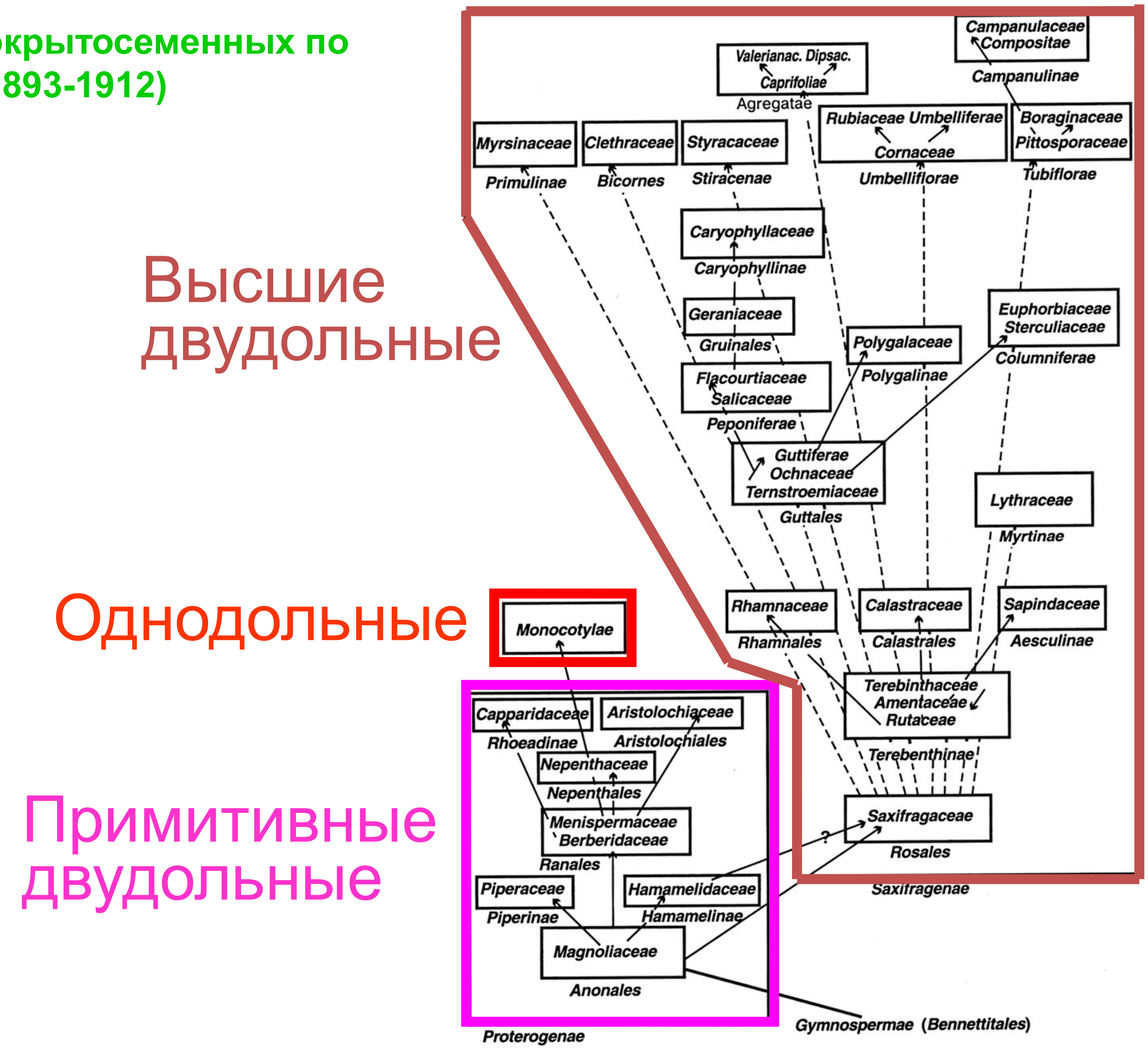
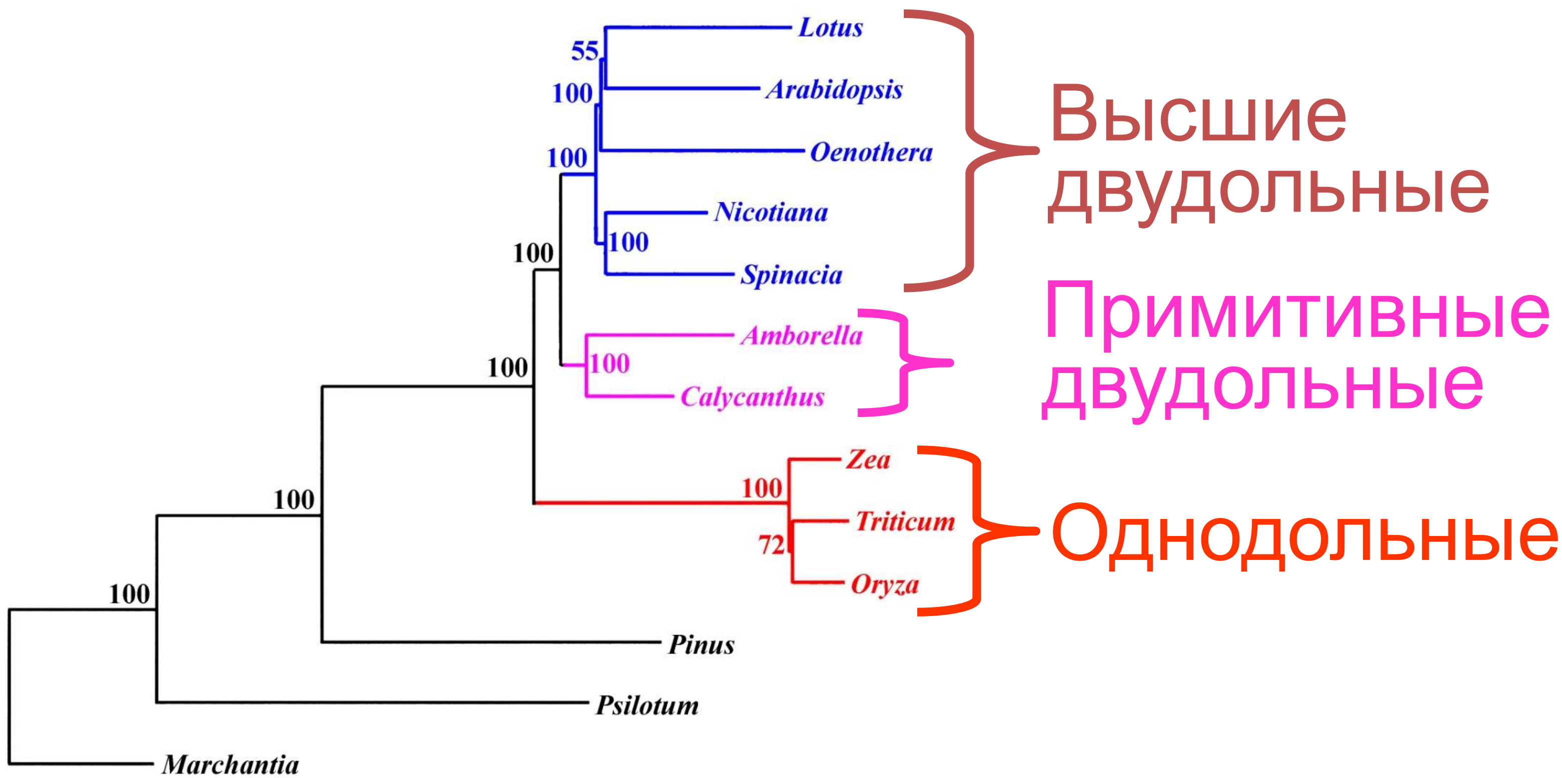


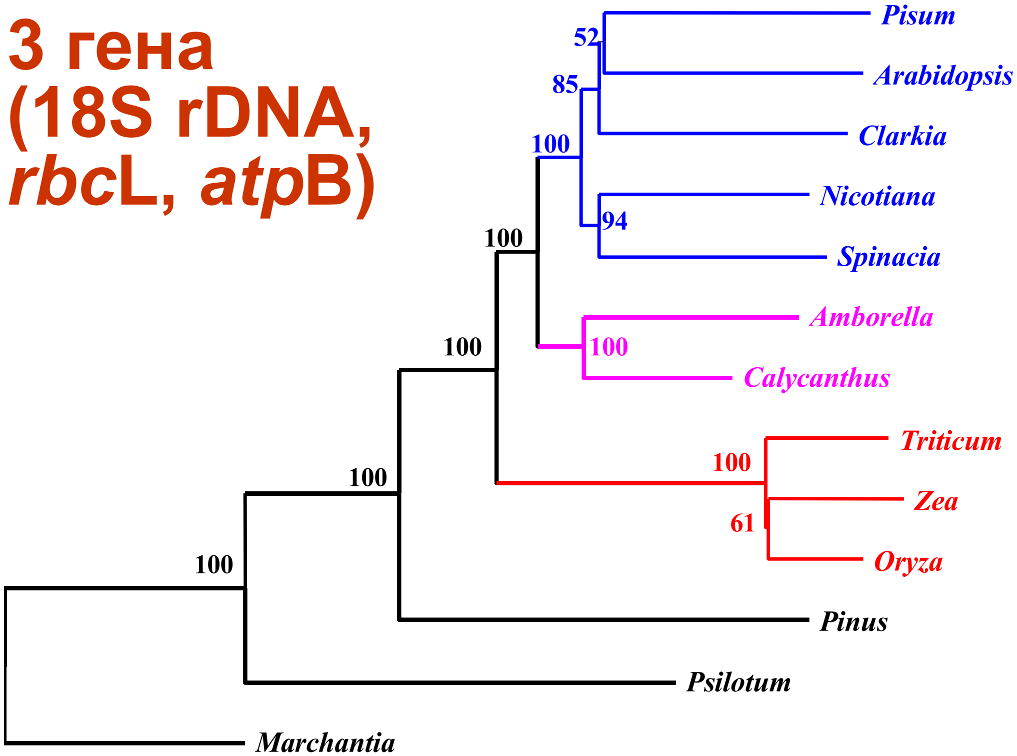
Рис. 5. Схема системы Г. Галлира

61 ген
(все белок-кодирующие гены хлоропластной ДНК)



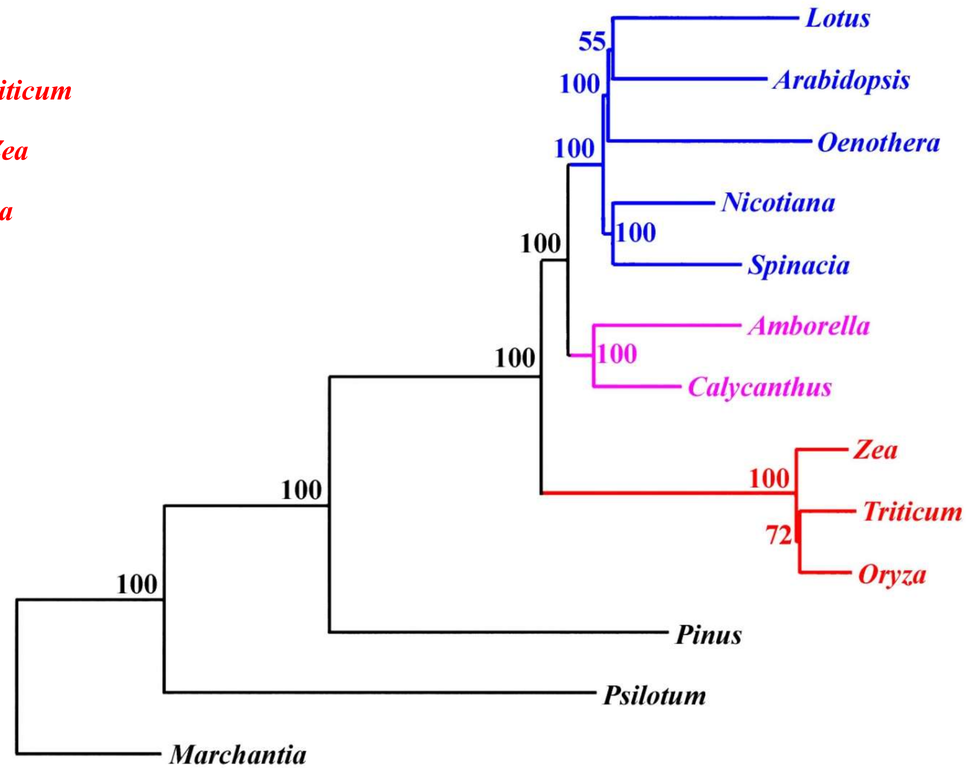
Goremykin et al., 2004

3 гена (18S rDNA, *rbc*L, *atp*B)



Degtjareva et al., 2004

61 ген
(все белок-кодирующие гены хлоропластной ДНК)

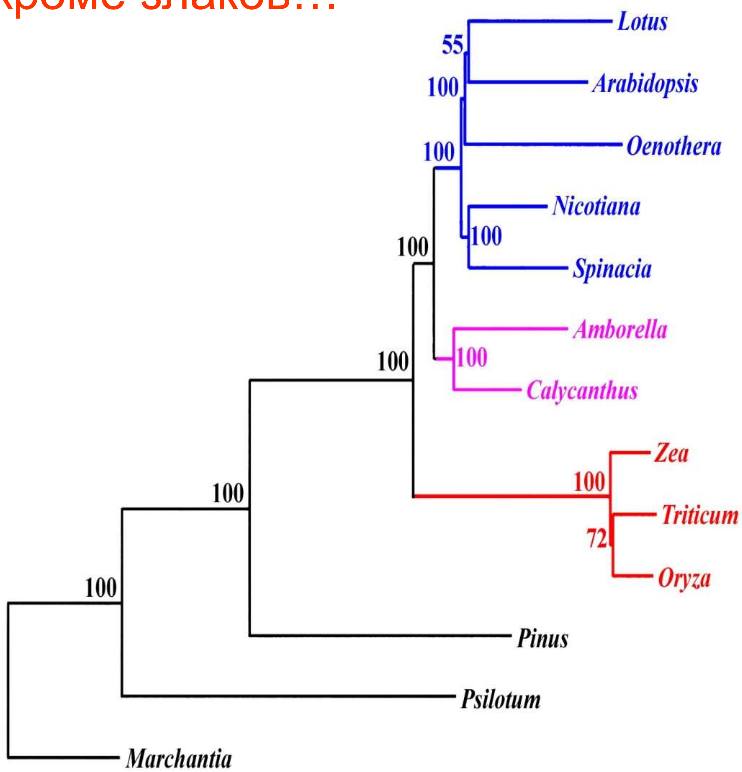


Goremykin et al., 2003

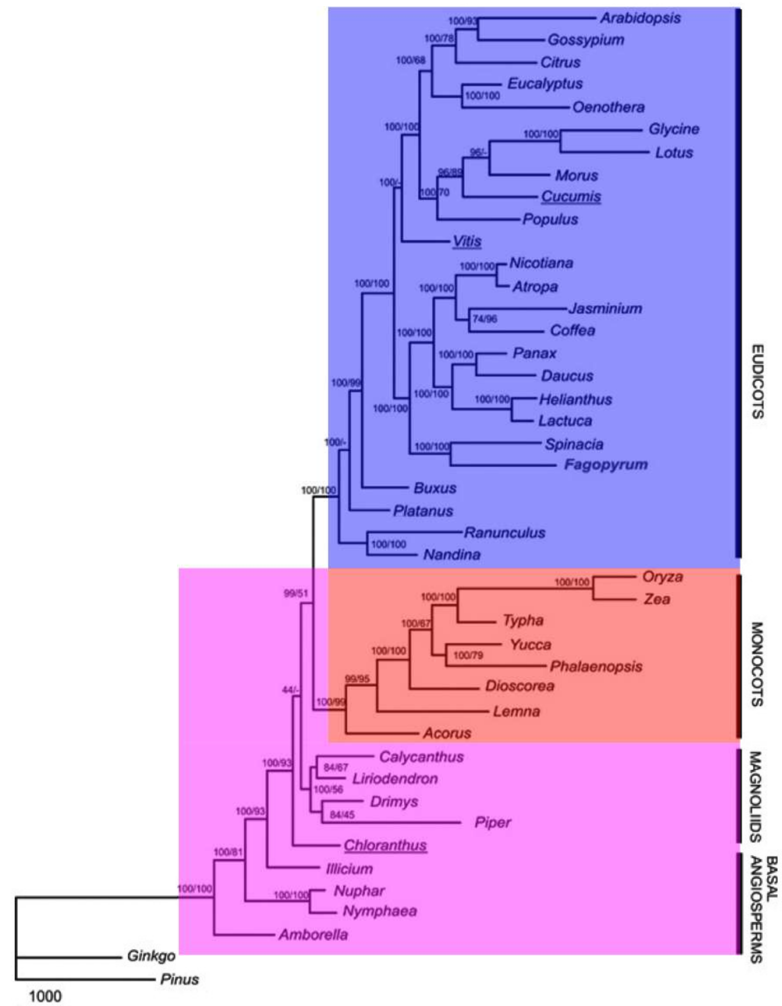
Деревья очень похожи друг на друга

Даже используя данные о полных хлоропластных геномах, «верное» положение однодольных не удается получить без привлечения репрезентативной выборки таксонов.

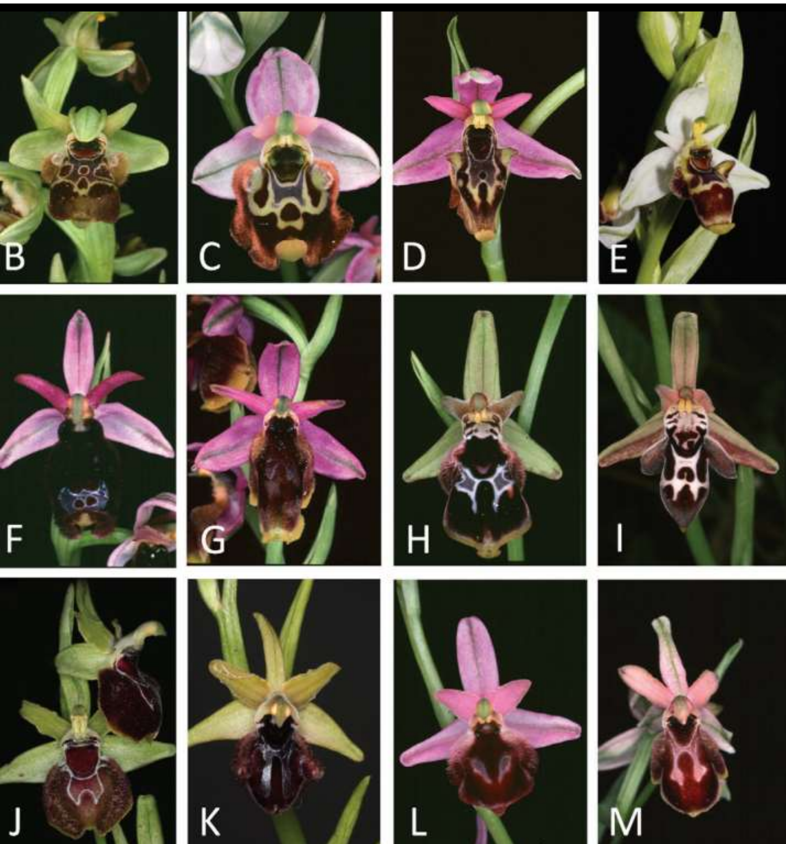
Представим себе, что вымерли все однодольные кроме злаков…

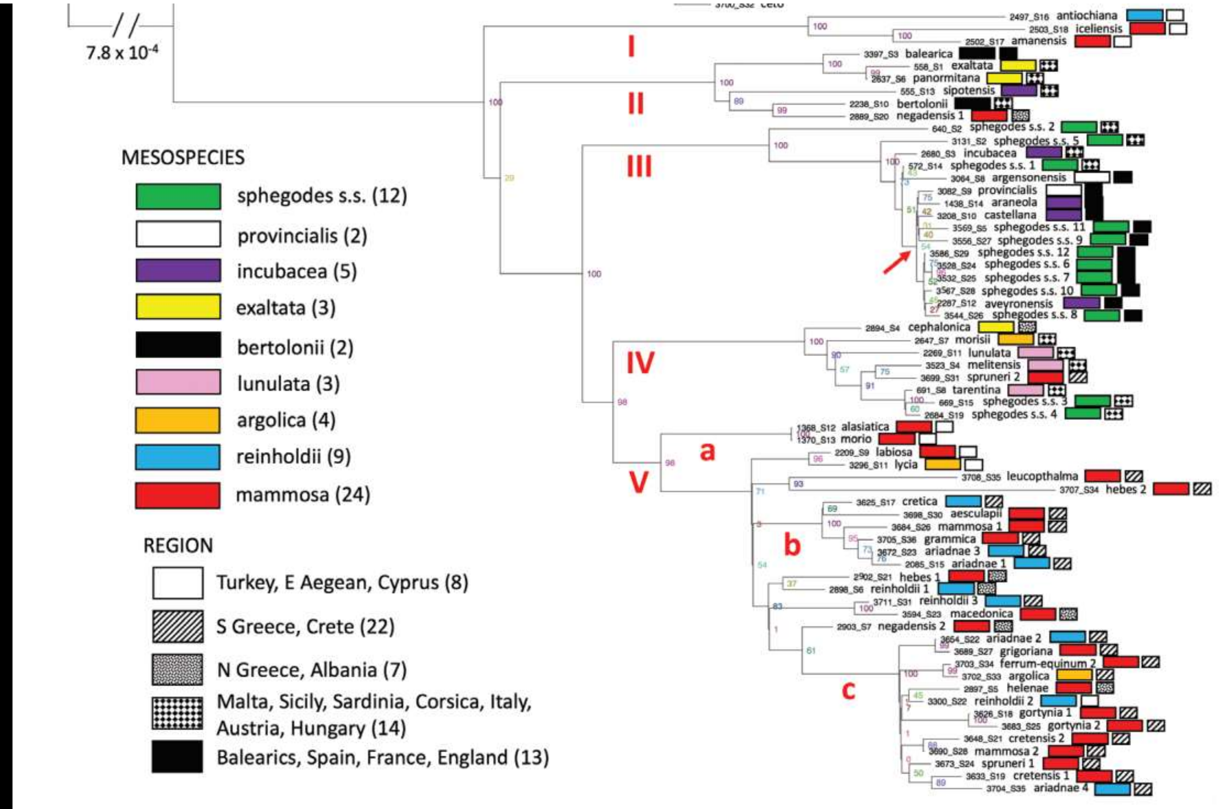


Goremykin et al., 2003



Logacheva et al., 2008





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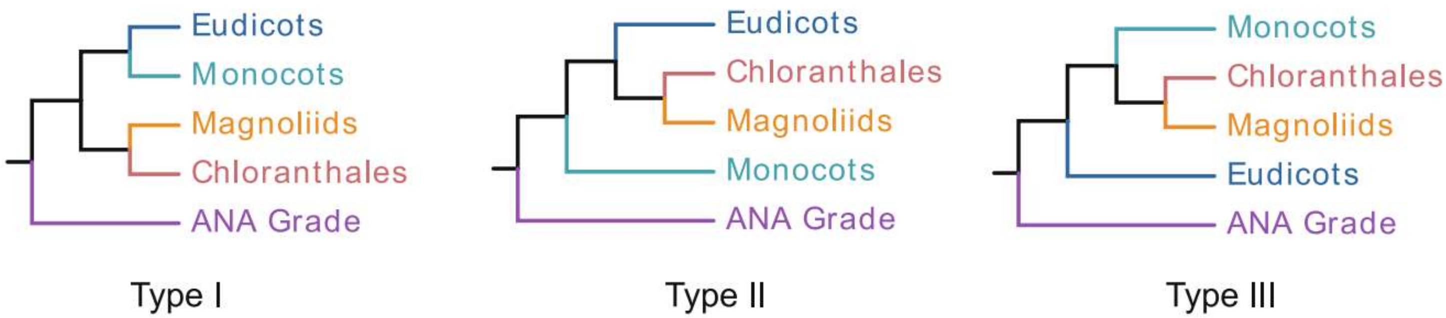
RESEARCH PAPER

Whole plastomes are not enough: phylogenomic and morphometric exploration at multiple demographic levels of the bee orchid clade *Ophrys* sect. *Sphegodes*

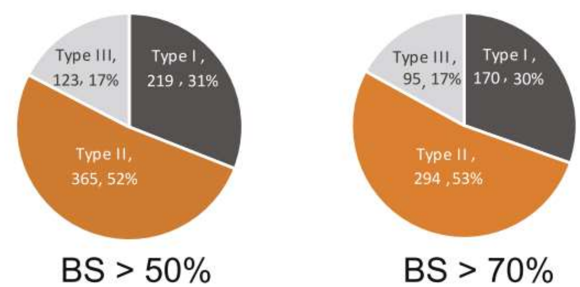
Richard M. Bateman*, Paula J. Rudall, Alexander R.M. Murphy, Robyn S. Cowan, Dion S. Devey and Oscar A. Peréz-Escobar

Royal Botanic Gardens Kew, Richmond, Surrey TW9 3AB, UK

Изучение ядерных геномов дает новые вопросы



	Type I	Type II	Type III	Unclassified
Trees	316	496	203	1314
BS<50%	97	131	80	\
BS>50%	219	365	123	\
BS>70%	170	294	95	\



Guo et al. Nature Communications | (2021) 12:6930 | https://doi.org/10.1038/s41467-021-26922-4 | www.nature.com/naturecommunications