Topic 01
Introduction to Plant Systematics

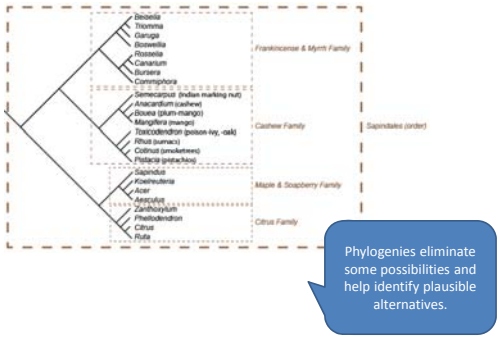
I. What is Systematics?

B. Important products

1. Species
2. Taxonomic monographs & floras (manuals, field guides)
3. Phylogenies & phylogenetic methods

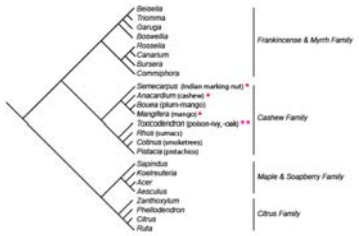
Primary use of phylogenies in systematics: doing taxonomy

Primary use of phylogenies in systematics: doing taxonomy

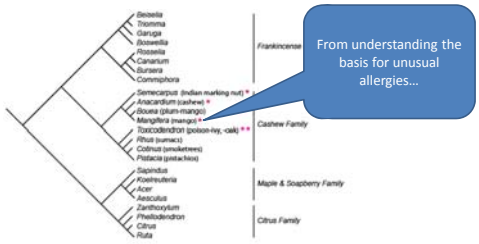


Phylogenies eliminate some possibilities and help identify plausible alternatives.

Broader impacts of phylogenies:

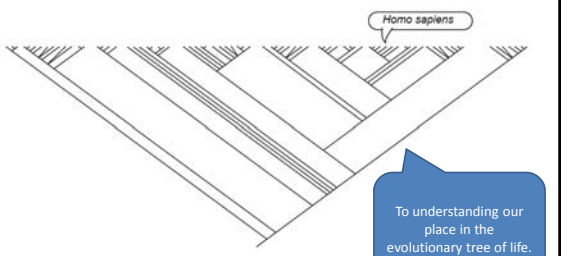


Broader impacts of phylogenies:



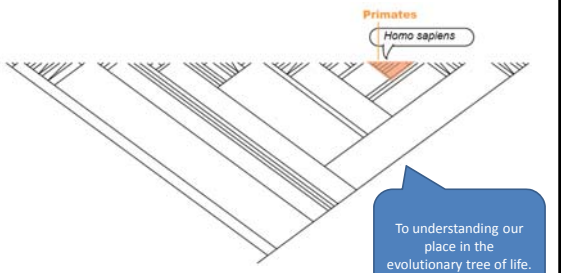
From understanding the basis for unusual allergies…

Broader impacts of phylogenies:



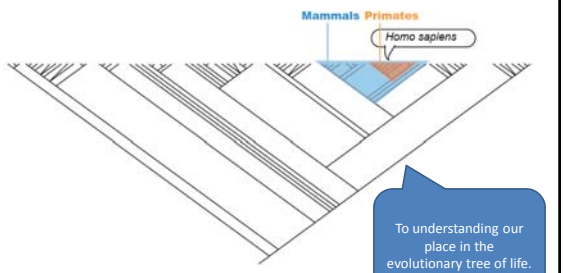
To understanding our place in the evolutionary tree of life.

Broader impacts of phylogenies:



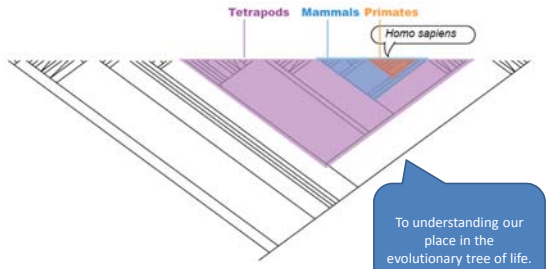
To understanding our place in the evolutionary tree of life.

Broader impacts of phylogenies:



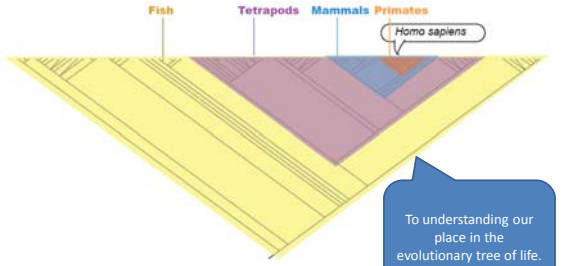
To understanding our place in the evolutionary tree of life.

Broader impacts of phylogenies:



To understanding our place in the evolutionary tree of life.

Broader impacts of phylogenies:



To understanding our place in the evolutionary tree of life.

II. Herbaria

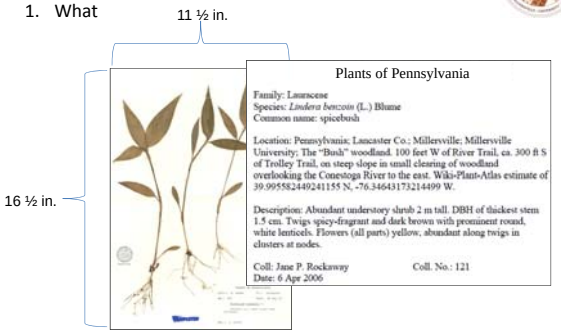
A. Herbarium specimens & important herbaria

1. What

II. Herbaria

A. Herbarium specimens & important herbaria

1. What



II. Herbaria



II. Herbaria

2. Important herbaria (after Index Herbariorum)

MVSC (ca. 15 thousand)
P (8 million)
NY (7.3 million)
K (7 million)
MO (5.9 million)
US (4.3 million)

II. Herbaria

3. Zoological analogs of herbaria

II. Herbaria

B. Use of specimens

1. document patterns of morphological and geographical variation in plant diversity: past, present, and future

Inter- & intraspecific morphological variation

Floristic (biotic) diversity, past & present

•accurate range estimates

e.g., maps from USDA PLANTS Database are based on herbarium specimens.

•accurate range estimates

e.g., the composition of floras and manuals are based on specimen occurrence records.

II. Herbaria

B. Use of specimens

2. the basis for new species descriptions and other taxonomic studies.

PhytoKeys 13: 5–14 (2012)
doi: 10.3897/phytokeys.13.2670
www.phytokeys.com

RESEARCH ARTICLE

PhytoKeys

Two new species of Gingers (Zingiberaceae)

Vinita G

1 *Dept. of Botany, MRC-166, P. O.* 2 *Ministry of Forestry, Departm*

Corresponding author: *Vinita Gowda (*

ACKNOWLEDGEMENTS. We would like to thank the faculty and staff at the following herbaria for providing loans or facilitating herbarium visits or fieldwork required for this study: AAU, AMAZ, B, BH, BM, CAS, COL, CR, CUZ, DUKE, F, FTG, GH, HBG, HUA, K, M, MICH, MO, NY, PMA, QCA, QCNE, S, SEL, STRI, TEX, U, UC, US, and USM. Tana Acton provided the illustrations (excluding the seeds) for *Plowmanianthus perforans*. Alice Tangerini provided the illustration of the flower for *P. grandifolius*. Douglas Daly kindly provided the photograph used for Figure 12C. Urs Jauch assisted with the scanning electron microscopy of stigmas. Deborah Bell, David Brenner, Robert Dressler and the late

This is what the new species look like….

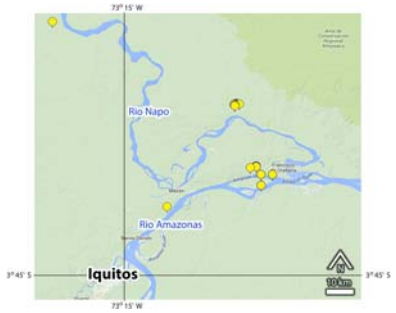
Description. Medium herb to 85 to 130 cm in height; rhizomes compact, yellow internally, with numerous white tubers (yellow internally). Leafy shoots loosely clumped, disarticulating during dry season, 3 to 5-leaved, with basal sheaths green with red speckles, glabrous, 20–22 × 4–5 cm. Plane of distichy parallel to rhizome. Leaves 60–70 cm in length, glabrous and coriacious; petiole 19–23 0.7–0.8 cm, glabrous, green with small red speckles, deeply grooved in cross-section, margin entire, smooth; ligule medium-sized, 1.5–3.2 cm in length, bi-lobed, thin and translucent, pale yellow green, glabrous; blade 43–49 × 17–20 cm, narrowly ovate, midrib below green with sparse red speckles, glabrous, base cordate, subequal, apex caudate, adaxial surface dark green. Inflorescence terminal on relatively long leafy shoot, erect 19–25 cm in height; peduncle 2–5 cm in length, glabrous, green to deep maroon red; rachis short; inflorescence bracts 25–30 per inflorescence, 2.4–2.9 × 2.5–3.4 cm, spirally arranged and imbricate, each fused at base to adjacent members ("pouched"), 40–50° from vertical axis, glabrous, green basally to deep red maroon distally; no coma. Cincinni one per bract containing 3–4 flowers, maturing from base to apex of inflorescence; bracteoles not tubular, 13–15 × 4–6 mm, translucent,

This is how to tell the new species apart (a dichotomous key)….

Key to Species of Geogenanthus

1. Leaf lamina variegated above, strongly bullate (resembling seer-sucker fabric).....*G. poeppigii*
1. Leaf lamina neither variegated and not bullate
   2. Aerial shoots terminated by a single (rarely 2) retund leaf, stems prostrate to very weakly ascending.....*G. ciliatus*
   2. Aerial shoots ending in a rosette of 3 or typically more leaves, lamina elliptic, stems usually distinctly erect
      3. Pedicels short (less than 5 mm long); inflorescence with > 2 alternate cincinni .....*G. brevipedicellatus*
      3. Pedicels very long (> 15 mm long); inflorescence with 1-2 terminal cincinni .....*G. rhizanthus*

This is where they grow and where you'll find them….



II. Herbaria

B. Use of specimens

3. teaching aids,

II. Herbaria

B. Use of specimens

4. reference specimens for applications requiring accurate species identification (e.g., forensics or taxonomic and floristic surveys)

II. Herbaria

B. Use of specimens

4. reference specimens for applications requiring accurate species identification (e.g., forensics or taxonomic and floristic surveys)

January 15, 2009

advice: Stay inside today

Wind chill of minus 20 predicted tonight

On with the show

bonsai

Pruning is a small part of maintaining these artistic plantings

Wing and a prayer

Pilot puts disabled plane in river; all survive

Canada geese brought Flight 1549 down, NTSB says

STORY HIGHLIGHTS

WASHINGTON (CNN) -- Canada geese got into both engines of US Airways Flight 1549 and forced the plane to ditch into the Hudson River last month, the National Transportation Safety Board said Thursday.

The flight crew of the Airbus A320 put the plane down gently on the river, which separates New York from New Jersey, after the bird ingestion caused both engines to lose power on January 15. All 155 people aboard survived.

Adult Canada geese weigh between 5.8 and 10.7 pounds, although birds from resident populations rather than migratory populations can be heavier.

The plane's CFM56-5B/P turbofan engines were certified in 1996 as being able to withstand bird ingestion of 4 pounds.

The NTSB said last week that both engines contained the remains of birds, confirming the pilots' report that the engines shut down after colliding with birds less than two minutes after taking off from New York's LaGuardia Airport.

Material from both engines was sent to the Smithsonian Institution in Washington for identification of the bird species.

5. archived voucher specimens to document the species identity of plants used for various other biological investigations.

Anti-Cancer Drug Discovery and Development in Brazil: Targeted Plant Collection as a Rational Strategy to Acquire Candidate Anti-Cancer Compounds

DENNIS R.A. MANS, ADRIANA B. DA ROCHA, GILBERTO SCHWARTSMANN

Materials and Methods

Collection of plant

Cordyline terminalis Kunth. (Liliaceae) was collected from the district of Narail during the month of January 2003 in its flowering stage and was identified by the National Herbarium of Bangladesh (accession no. 29752).

Extraction

The collected plant parts (leaves) were washed with water, separated from undesirable materials or plants or plant parts. They were sun-dried for one week after cutting into small

II. Herbaria

C. How to make a specimen

1. Collecting
2. Pressing & Drying
3. Mounting

See Dirig (2005)