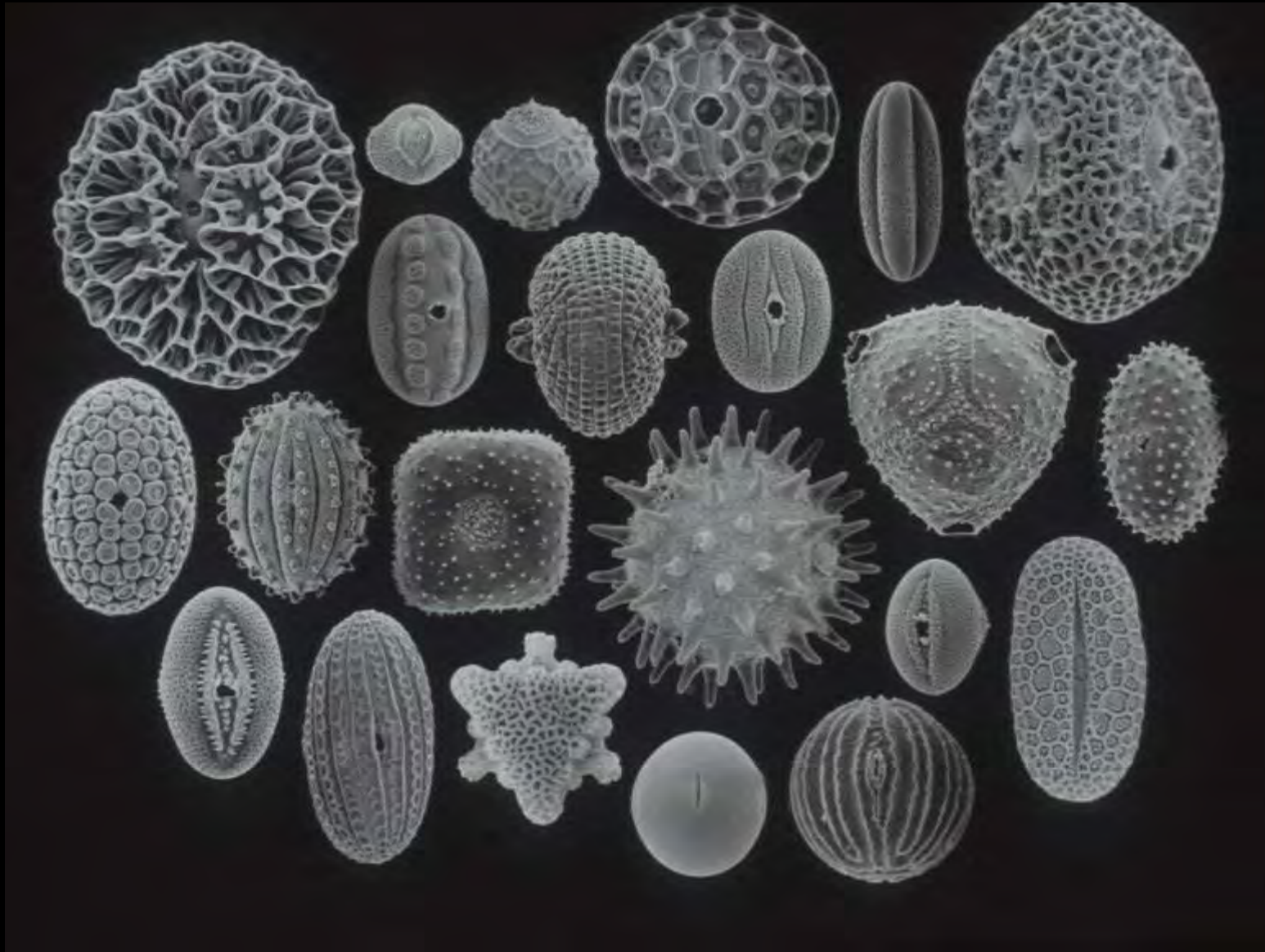


The Talk

Current Oxford Taxonomic projects

Ask for help in assembling 60,000
photographs of UK flowering plants

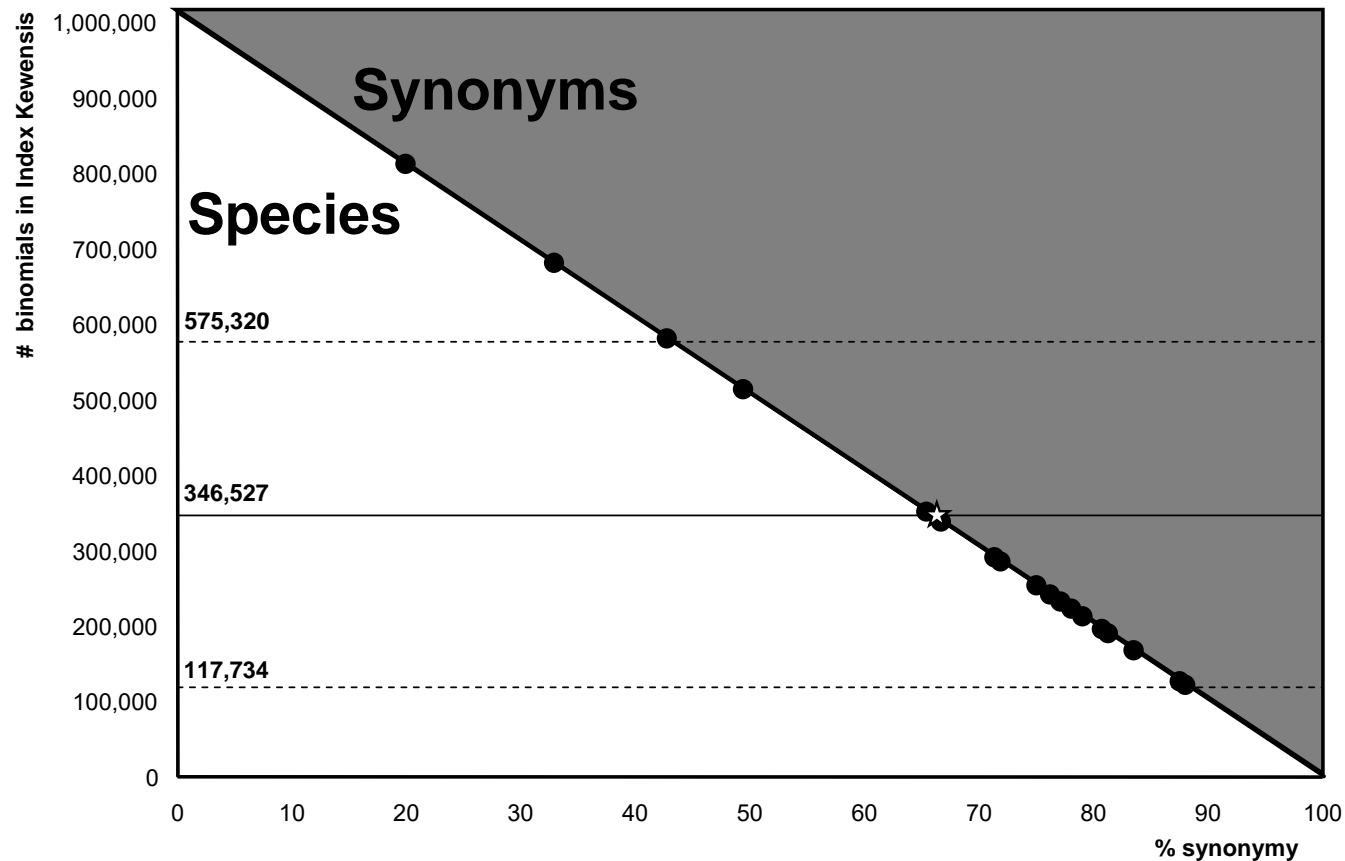
Acanthaceae Pollen



State of Knowledge World Flora

- **350,000** described species of flowering plant
- 15-20% still to be described: **70,000** species

13 in every 20 names are synonyms



From c. 1 million published names, on average 65% are synonyms? = 350,000 accepted

Taxonomic Revisions and new species

Taxon	Total number of species	Number of sp. nov.	% of sp. nov.
<i>Strobilanthes</i> : South and South East Asia	440	60	14
<i>Hypericum</i> : temperate and subtropical regions of N. America, Europe, Turkey, Russia, India and China	470	93	20
<i>Agalmyla</i> : Malesia	97	58	59
<i>Aframomum</i> : Africa	64	19	29
<i>Inga</i> : tropical America	252	33	13
<i>Chrysobalanaceae</i> : pantropical	528	214	40
Total	1851	477	25



new species of *Strobilanthes* first collected
more than 50 years ago



Strobilanthes frondosa first collected in 1924 from Burma (Cooper 5943A), described and published 70 years later



Strobilanthes paniculiformis first collected in 1882,
described and published 124 years later in 2006



Lack of revisionary taxonomy, Herbaria full of undiscovered species

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7 December 2010 Last updated at 09:57

Thousands of plant species 'undiscovered in cupboards'

By Neil Bowdler
Science reporter, BBC News

More than 35,000 new species of flowering plants may be lying undiscovered in cupboards around the world, it is claimed.

Botanists looked at how long it takes for new species collected in the field to be identified, and found it often took decades.

They concluded that of the 70,000 flowering plants that experts believe are yet to be found, over half may already be in collections, awaiting identification.

The study is published in the **Proceedings of the National Academy of Sciences**.

Plants have been catalogued for hundreds of years. Traditionally, potential new species are dried and mounted on cardboard, labelled and placed in what is known as a herbarium for safekeeping.



Species of *Strobilanthes* collected in "herbaria" and identified only decades later

- 14% of specimens are described as new within 5 years of being collected
- On average it takes 35 years for a specimen to be recognised and described as new



Strobilanthes frondosa first collected in 1924 from Burma (Cooper 5943A), described and published 70 years later

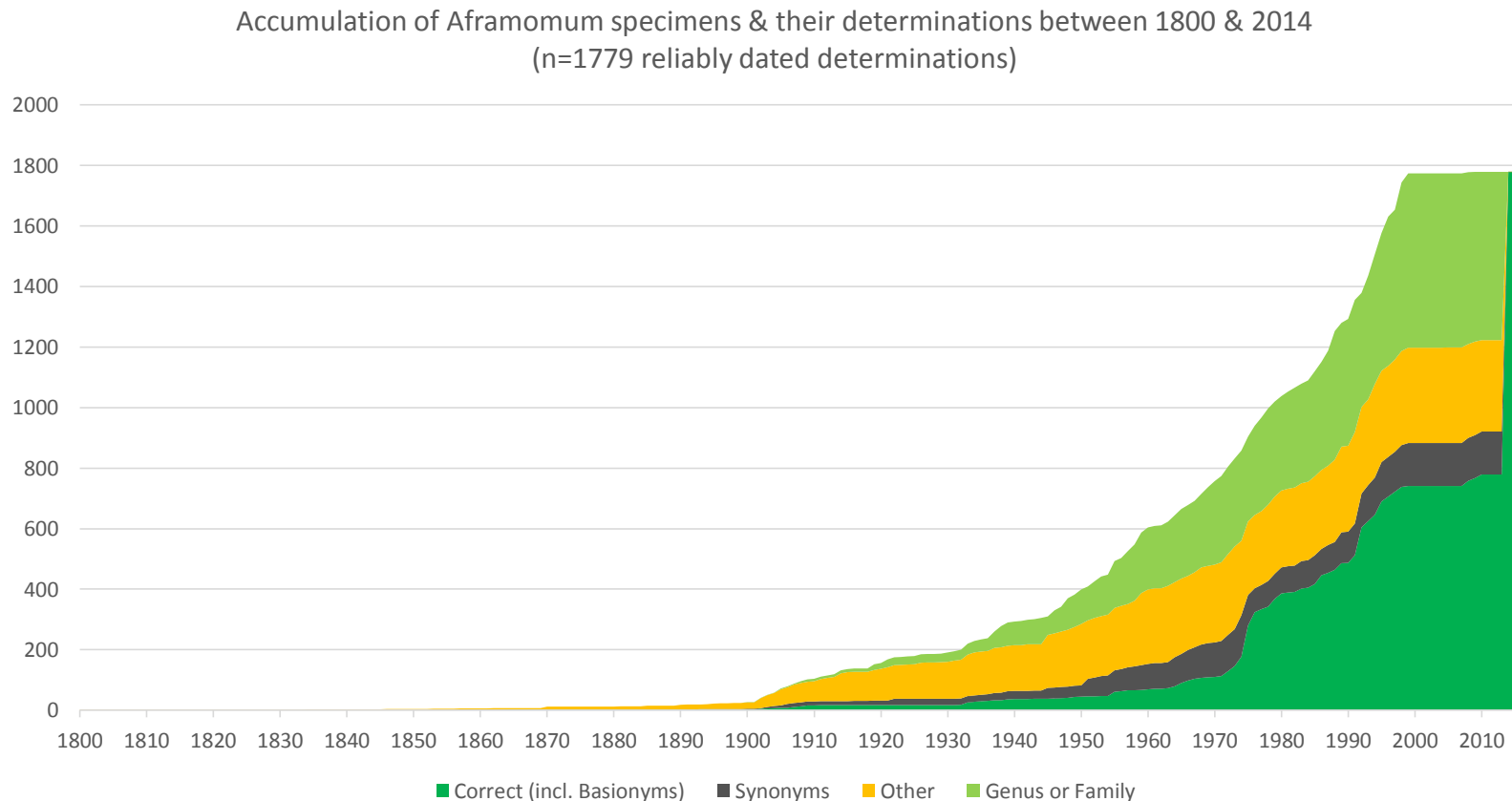
Aframomum

The need for revisions

- Monographed 1904 (Schumann), 41 species from 157 specimens
- Monographed 2014 (Harris & Wortley), 61 species c. 3000 specimens
- Total number of published names 146 and associated literature



Determinations of *Aframomum* specimens and collections over time



A foundation monograph of *Convolvulus* L. (Convolvulaceae)

John R.L. Wood^{1,5}, Bethany R.M. Williams^{1,2}, Thomas C. Mitchell³,
Mark A. Carine², David J. Harris⁴, Robert W. Scotland¹

190 species recognised: 4 new species, 2 sub-species, 2 varieties,
extensive synonymy, ten taxa at new ranks. Phylogeny clearing showing
Calystegia is part of *Convolvulus*

Revision of *Ipomoea* in Bolivia



- Most recent checklist: 34 species (12 are synonyms)
- Current Revision: 102 species, 5 fold increase
- *Sp. Nov.* 18 species

Wood et al, in press



Integration of molecules and morphology

- *I. pandurata* and *I. chondrosepala* have a similar morphology (large flowers, blunt sepals)
- BUT....
 - *I. pandurata* – North American
 - *I. chondrosepala* – South American



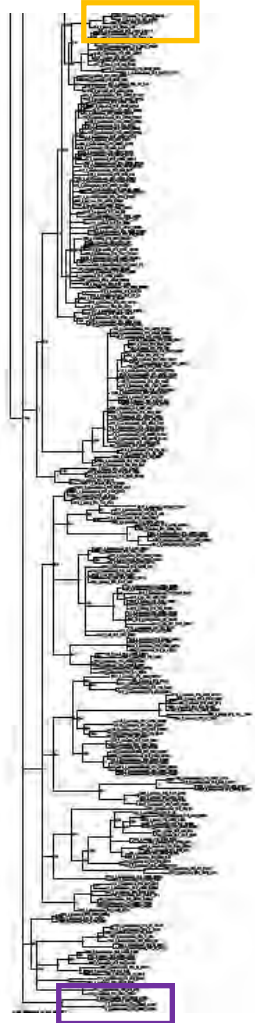
I. chondrosepala



I. pandurata



Integration of molecules and morphology



- *I. cerrito* and *I. subrevoluta* have a similar morphology (divided leaves)
- But....
 - *I. cerrito* - dry granite rock domes
 - *I. subrevoluta* - swamps

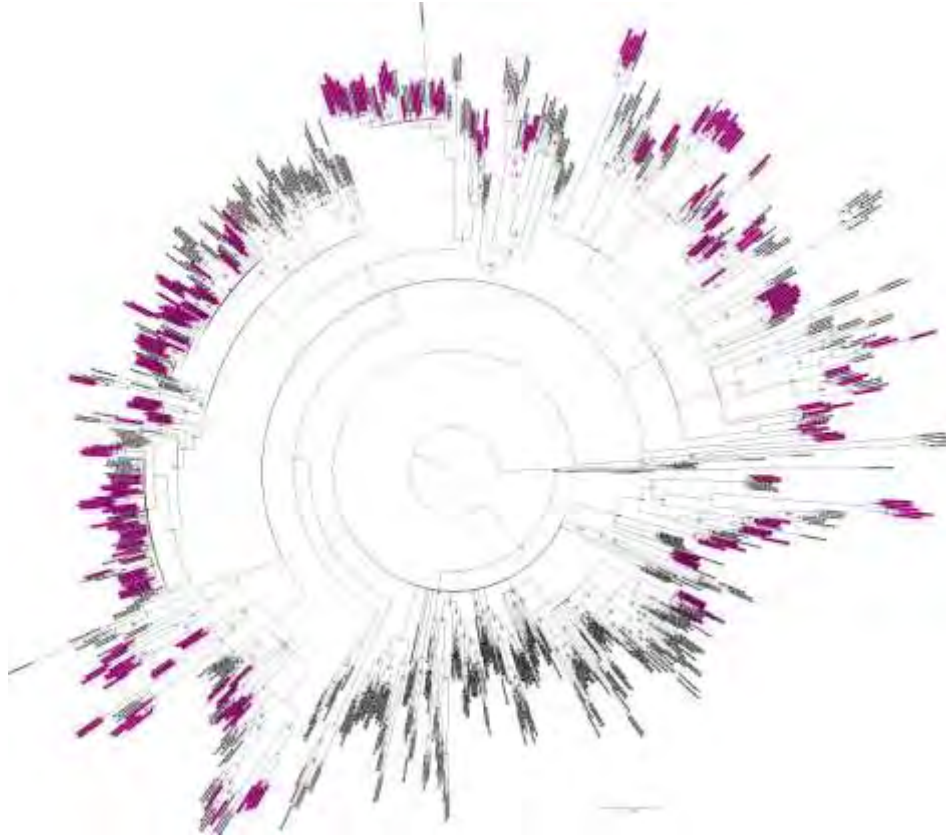


I. cerrito



I. subrevoluta

Phylogeny of *Ipomoea* from herbarium specimens



1400 herbarium specimens sequenced for *Ipomoea* representing 500 species



Identification tools: maybe best to start on flora that is well known

- Morphological characters
- DNA barcodes, complete for UK flora
- Photographic recognition software,
leaf snap, <http://leafsnap.com/>
naturetale, http://www.naturetaleapp.com/how_naturetale_works.htm
- Geographical distribution data

Visual Geometry Group

Department of Engineering Science, University of Oxford



UNIVERSITY OF
OXFORD

Flower Species Recognition

[Yuning Chai](#), [Victor Lempitsky](#) and [Andrew Zisserman](#)

This project is about flower species recognition based on images. So far, the recognition system has learnt the appearance of 102 different flower species which are common in the United Kingdom ([see all species](#)).

In the demo below, users are welcome to test out the recognition system by dragging an image from the left into the box to the right and clicking the submit button.

Demo

Interested in one of the flowers below? Just drag it into the box, click "submit" and get additional information about it!

Go to the [recognition demo page](#), where images can be uploaded from URLs or files.



submit

Technology

Recognition proceeds in two steps: segmentation and classification.



Segmentation



Recognition

Daffodil



Mobile Phone App to identify UK flowering plants

Uploading site

http://lewis.robots.ox.ac.uk:8004/upload_alts

And the uploaded images can be viewed at:

http://lewis.robots.ox.ac.uk:8004/upload_alts_viz

Oxford University Flower Photos Uploader

Show/hide Photograph Quality Guidelines (Please read!)

In general, we are looking for images that:

- Are of good quality (for example, not blurred).
- Contain one species of natural flowers. It might have more than one flowers, as long as they all belong to one species.
- Have flowers that are large enough so people can tell them apart from other species.
- Have the flowers in *focus*. Most people should see the flowers as the foreground of the image.

We've gathered a few good and bad examples which will help us to explain the photographs we are looking for:

Good images



Although one flower is blurred, the other one is not



Multiple flowers are okay, as long as they are all from the wanted species



The same flower species can have different colors



Normally, we don't want cropped flowers. But there is one in this image that is not cropped



Although each flower is small, they form a unit that is distinctive

Bad images



Blurred



This is a drawing not a photo



The photograph clearly contains two different flower species



Each individual flower instance is too small



Flower too large and cropped



Contains an insect that occludes the flower



Photograph has been artificially modified



It is unclear which object is in focus

Step 1: uploader details

Please enter your name and email address (for crediting purposes). Feel free to leave the fields clear if you want to stay anonymous.

Name (optional):

Email (optional):

Step 2: enter a species name

Our main focus is UK native flowering plants but we are also interested in those that are naturalized. [Here](#) is a complete list of UK native flowering plants. Please enter the scientific name (last column on list, for example, *Digitalis purpurea* for the common name *foxglove*), for the flower of which you have photographs to upload. If you only have a common name (for example, *rose*) please use Google or Wikipedia to translate it into a **best guess** scientific name. The identification of submitted images will be checked and authenticated at Oxford.

Please only upload photographs from one species at a time.

Species name (required):

Step 3: add images

Drag and drop your flower photos to anywhere within this page, or use the "Add files..." button. Note, file names do not matter.

Drop files here

Add files...

Cancel upload

SUBMIT

Step 4: submit

By clicking "Upload" below, I grant the University of Oxford the rights to make use of my uploaded photographs for academic purposes, including displaying for the general public, provided my name is credited.

Thanks for uploading your photographs for our scientific use. If you have any questions, please contact [us](#).

Upload

Uploaded site

Ranunculus tripartitus



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In Summary

- Help required to obtain c. 60000 pics, 40 x 1450, BSBI, Natural England, Field Studies Council.
- What percentage and role can digital recognition software play in identifying flowering plants
- Generic level, maybe?
- In combination with other data, barcodes, morphology, keys, maps etc.