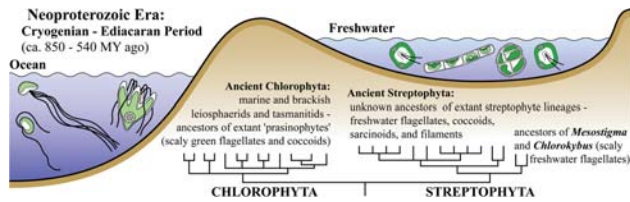


News in Botany: Nigel Chaffey presents a round-up of plant-based items from the world's media

Proof of phytological principle



Sadly, we don't have time machines that would permit us to go back and see ancient evolution in action. So we have to make do with such devices and stratagems as inference, surmise, speculation, good honest-to-goodness old-fashioned guesswork, and investigating modern-day equivalents that might mimic the original phenomenon. Take for instance colonisation of the land by 'plants'. Arguably, this was one of the most important events in creation of the modern-day planet we call home, but how could 'terraphyte's' ancestors survive a much drier land-living existence and thus pave the way for a terrestrial take-over? Trying to get a handle on early plant adaptation to land, Linda Graham *et al.* (*American Journal of Botany* **99**: 130–144, 2012) have studied how well assumedly obligately aquatic algae could survive an 'aero-terrestrial' existence (i.e. living on and in soil, or covering surfaces such as rocks and tree barks; <http://www.algaterra.org/AT5.htm>). The group used 'two species of the experimentally tractable, complex streptophyte algal genus *Coleochaete*', chosen because it is one of the extant green algal genera most closely related to the embryophytes – the so-called 'land plants' (<http://en.wikipedia.org/wiki/Embryophytes>; see Burkhard Becker and Birger Marin's Botanical Briefing in *Annals of Botany* **103**: 999–1004, 2009) – and therefore a plausible putative palaeological plant progenitor. What they discovered suggests that ancient complex streptophyte algae could grow and reproduce in moist subaerial habitats, and persist through periods of desiccation – as you'd need to in order to occupy a drier habitat. Consequently, land colonisation could be envisaged by ancient *Coleochaete*-like organisms (which are freshwater aquatics). Which is good to know, and also accords with the very latest ideas in terms of identifying the nebulous 'crucible of creation', which may not have been the oceans – as long thought – but freshwater ponds, according to work by Armen Mulkidjanian *et al.* (*PNAS*, in press, 2012). Whilst this may upset the apple-cart (<http://www.americanidioms.net/Upset-the-apple-cart/>) of received wisdom in that field in challenging firmly held, long-cherished beliefs, at least it's still arguing for an important aquatic dimension (even though it can be argued that it proposes that life on Earth originated on land – but let's leave further deliberation thereon to the semanticists...). But! – and as pointed out by others – this 21st Century idea is reminiscent of the notion that evolution may have begun in a 'warm little pond', posited by a certain Mr C. Darwin in 1871 (<http://www.darwinproject.ac.uk/editors-blog/2012/02/15/darwins-warm-little-pond/>). Which only goes to show that there's practically nothing in biology that has not already been created by CD (and that ideas about evolution just keep evolving!). [Mr Cuttings thought he'd invented the word terraphyte in penning this item. Well, he had, but not originally it would seem. In a 'covering his

backside' moment, an internet search has revealed that the term has been used previously by 'aquetus' – interestingly in an article that has a strong warning about plagiarism – at http://www.loggods.com/pestilence/aequetus/Sem4/BIO1009/PLANTS/summary_wk12.pdf – Ed.]

Image: Becker & Marin (2009). Streptophyte algae and the origin of emryophytes. *Annals of Botany* 103: 999–1004.

Putative phytological pugilism (probably ...) [or, One species – two genomes?]

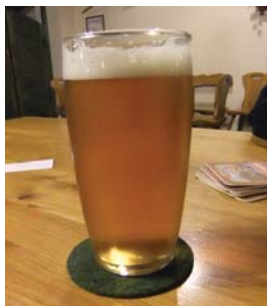


In the genteel world of botany, one may be surprised to discover that – occasionally! – disagreements can arise, and that tempers can get just a little heated. Well, in an attempt to expose the darker side to the otherwise seemingly tranquil and sweetness-and-light domain of plant biology – and incidentally to show what the '-phyte' suffix really means! – I offer the following cautionary tale. When a species' genome – draft or otherwise – is published, you assume that to be definitive. But in the case of pigeon pea (*Cajanus cajan* – 'an orphan legume crop of resource-poor farmers') it seems that this may not be the case. I was interested to note that a draft of the pigeon pea genome had been published by Rajeev Varshney and co-workers (*Nature Biotechnology* **30**: 83–89, 2012). And reading that the report 'presents the genome of the first orphan legume crop and the second food legume (after soybean)', I was happy to leave it at that. However, noting that *C. cajan* 'plays a substantial role in the livelihood of resource-poor smallholder farmers in marginal environments', I was keen to find out more about this crop plant and duly consulted the oracle – aka Wikipedia [I can anticipate/sense your communal shudder as I write/you read those words, but I'm allowed to do this – see 'Embrace Wikipedia! (?)' item: *Annals of Botany* **109**(2): iii–iv]. Well, I certainly found more than I was expecting, including this gem, 'The first draft of pigeon pea genome sequence was done by a group of 31 Indian scientists from the Indian Council of Agricultural Research under the leadership of Nagendra Kumar Singh. The paper is published in one of the Indian journal' [*sic*] (<http://en.wikipedia.org/wiki/Pigeonpea>). I don't know who contributed to the Wikipedia entry, but I tracked down the article referred to – by Nagendra K. Singh *et al.* in the *Journal of Plant Biochemistry and Biotechnology* (**21**: 98–112, 2012), and entitled, 'The first draft of the pigeonpea genome sequence'. Interestingly, both papers sequenced pigeon pea variety 'Asha', but Singh *et al.*'s was received by the journal on 2nd July 2011, whereas Varshney *et al.*'s wasn't received until... 19th July 2011. (Interestingly, Singh *et al.*'s paper wasn't cited by Varshney *et al.* – but you wouldn't necessarily expect it to be since both manuscripts were received within a few days of each other...). But, as Varshney *et al.* opine, 'This reference genome sequence will facilitate the identification of the genetic basis of agronomically important traits, and accelerate the development of improved

pigeonpea varieties that could improve food security in many developing countries'. So, whatever the ins-and-outs or rights-and-wrongs of this incident – and we must surely recognise that this has ‘put the cat amongst the “pigeons”’ (<http://idioms.thefreedictionary.com/put+the+cat+among+the+pigeons>) – isn't it good that we have such a great genomic resource for this crop plant (that I suspect many of us had probably not heard much about before)? Surely, we can all agree on that? Well, maybe not. Ultimately, and regardless of who achieved this feat first, how close are the two published genomes? Are they the same? If not, is one more ‘correct’ than the other? Which one should be used to do further work with this important legume, known as ‘the poor man’s meat’ (<http://www.hindu.com/mp/2005/04/02/stories/2005040201570400.htm>)? [Should you desire to read more about this ‘Controversy over pigeonpea genome’, visit <http://agrariancrisis.in/2011/11/09/controversy-over-pigeonpea-genome/> or <http://www.jamesandthegiantcorn.com/2011/11/26/bad-blood-on-pigeonpea/> – Ed.]

Image: Muhammad Irshad Ansari/Wikimedia Commons.

The clue's in the title (but is it?)



With no disrespect intended to the authors – Takashi Yaeno *et al.* – who, at first glance, is able to tell me what the article entitled, ‘Phosphatidylinositol monophosphate-binding interface in the oomycete RXLR effector AVR3a is required for its stability in host cells to modulate plant immunity’ (*PNAS* **108**: 14682–14687, 2011) is about? I know, I

struggled with it, too. And if it wasn't for the user-friendlier text of such science-news-disseminating sites as PhysOrg.Com (<http://www.physorg.com/news/2011-12-revealing-potato-disease.html>) – which more-informatively summarises that paper thus, ‘*Phytophthora infestans* [sadly, that scientific name not italicised], the causal agent of late blight, has evolved to overcome fungicides and major resistance genes that have been bred into commercial potato cultivars. In order to dampen the immune response of its host, *P. infestans* secretes molecules called disease effectors at the site of infection’ – this eminently newsworthy piece of science would have completely passed me by. OK, I suppose the clue in the title is the term ‘oomycete’, which often – and rightly so on this occasion – rings alarm bells in my mind because I associate it with *Phytophthora infestans* (an organism that once-upon-a-time was numbered amongst the fungi), which causes a devastating disease of potatoes, potato late blight (http://en.wikipedia.org/wiki/Phytophthora_infestans). Which disease historically – and infamously – caused tremendous suffering in Ireland and is oft-cited as the cause of one of the world's most famous diasporas (<http://en.wikipedia.org/wiki/Diaspora>) that saw hundreds of thousand of Irishmen, -women and -children emigrating to North America in the mid-19th Century (http://en.wikipedia.org/wiki/Great_Famine_%28Ireland%29). And the point of this Cuttings' item is to highlight the debate about the importance of the title to a scientific article. Well, there really isn't any debate – titles are important, as aired in a blog by graduate student bryologist Jessica Budke ([\[mossplants.fieldofscience.com/2011/11/is-title-of-your-scientific-publication.html\]\(http://mossplants.fieldofscience.com/2011/11/is-title-of-your-scientific-publication.html\)\). Musing on the merits of humorous or otherwise titles, Budke cited some intriguing studies that examined these testy titular topics. Hamid Jamali and Mahsa Nikzad \(*Scientometrics* **88**: 653–661, 2011\) in their straightforwardly entitled, ‘Article title type and its relation with the number of downloads and citations’ analysed more than 2000 articles from *PLoS* journals \(Public Library of Science; <http://www.plos.org/>\). They concluded that, ‘articles with question titles tended to be downloaded more but cited less than the others. Articles with longer titles were downloaded slightly less than the articles with shorter titles. Titles with colon tended to be longer and receive fewer downloads and citations. As expected, number of downloads and citations were positively correlated’. Also cited by Budke, Itay Sagi and Eldad Yechiam's equally non-sensationalistically entitled paper, ‘Amusing titles in scientific journals and article citation’ \(*Journal of Information Science* **34**: 680–687, 2008\) examined articles in *Psychological Bulletin* and the *Psychological Review*. They found that, ‘articles with highly amusing titles ... received fewer citations’. Interestingly, a responder to Budke's blog highlighted the case of Tom Rees who has become increasingly irked by titles featuring colons. Hmmm, one of the worst cases of colonic irritation I've come across ... And, to some extent contradictorily, Thomas Jacques and Neil Sebire – who analysed medical journals \(*Journal of the Royal Society of Medicine Short Reports* 2010, **1**: 2\) – found that, ‘The number of citations was positively correlated with the length of the title, the presence of a colon in the title and the presence of an acronym’. What can we deduce from the foregoing? You cannot necessarily predict what a good title will be, but that medical types like colons \(well, they would, wouldn't they?; \[http://en.wikipedia.org/wiki/Colon_%28anatomy%29\]\(http://en.wikipedia.org/wiki/Colon_%28anatomy%29\)\). Titles: all a bit too hit-and-miss? Maybe, but let's conclude with some sage words of advice from SciDev.Net, ‘A title should be the fewest possible words that accurately describe the content of the paper’ \(<http://www.scidev.net/en/practical-guides/how-do-i-write-a-scientific-paper-.html>\). And – in that vein – one is pleased to report that a subsequent paper from ‘the group of Sophien Kamoun at The Sainsbury Lab’ \(<http://www.scoop.it/t/publications>\) that began this news item has a much-more-obvious-what-it's-about title in a follow-up article by Tolga Bozkurt *et al.*: ‘*Phytophthora infestans* effector AVRblb2 prevents secretion of a plant immune protease at the haustorial interface’ \(*PNAS* **108**: 20832–20837\). But let's be honest, though: the main interest in issue No. 35 – which contained the ‘Yaeno *et al.* oomycete paper’ – was the fungus-related lager yeast item by Diego Libkind *et al.* \(*PNAS* **108**: 14539–14544, 2011\) soberly entitled – and far removed from a colon – ‘Microbe domestication and the identification of the wild genetic stock of lager-brewing yeast’. Which tells how, ‘in the 15th century, when Europeans first began moving people and goods across the Atlantic, a microscopic stowaway somehow made its way to the caves and monasteries of Bavaria’ \(<http://www.physorg.com/news/2011-08-years-yeast-epic-journey-gave.html>\). Cheers! \[Given that – taken together – their titles break every known rule, I intend keeping a very close eye on the citation/download rates of my own *Plant Cuttings*' items!\] \[So do I\(!\) – Ed.\]](http://</p>
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Image: Petr Heřman/Wikimedia Commons.

Botany, a man's world?



What do you make of this: ‘In the 18th century, not yet 30 years old, she became the first woman to travel around the world. Along the way she helped collect thousands of plant specimens, some of which were new species. And she did it all dressed as a man’ (<http://blogs.scientificamerican.com/observations/2012/01/05/>)? Sounds incredible, I know but apparently it

is true and relates to one Ms Baret (or Baré; http://en.wikipedia.org/wiki/Jeanne_Baret). To cut a long (but fascinating!) story short, a wrong – that no plant was named after this indefatigable plants-person – has now been righted by Eric Tepe *et al.* (*PhytoKeys* **8**: 37–47, 2012). Their article entitled, ‘A new species of *Solanum* named for Jeanne Baret, an overlooked contributor to the history of botany’ (and what a good title! See item elsewhere in this month’s *Cuttings* . . .) formally describes *Solanum baretiae* Tepe, sp. nov. As the authors proudly declare ‘This species in [*sic*] named in honor of Jeanne Baret (1740–1807), an unwitting explorer who risked life and limb for love of botany and, in doing so, became the first woman to circumnavigate the world . . . a woman dressed as a man, a female botanist in a male-dominated field, and a working class woman who had travelled farther than most aristocrats’. Fittingly, *S. baretiae* is a new member of a cosmopolitanly cultivated,

well-travelled and important food genus, suitably befitting for such a cosmopolitan, well-travelled lady! And let us not forget that the genus *Solanum* includes *S. tuberosum*, the potato (<http://en.wikipedia.org/wiki/Potato>), which itself can be dressed up in many different guises, e.g. chips (aka ‘fries’ in the USA, ‘frites’ in France, and – allegedly – ‘Fritz’ in Germany), mashed potato, duchess potato (http://en.wikipedia.org/wiki/Duchess_potatoes), jacket potato and crisps (bizarrely ‘chips’ in the USA). But cross-dressing, eh? I think I’d be cross if I had to dress as a woman to pursue my botanical passion; but if that’s what it takes . . . Hopefully, however, and nowadays, we are much more egalitarian and anybody with the appropriate aptitude can aspire to be a botanist. Though with scientific names like *Phallus impudicus* (http://en.wikipedia.org/wiki/Phallus_impudicus) and *Clitoria* (<http://en.wikipedia.org/wiki/Clitoria>) for organisms within the remit of the Melbourne Code (http://en.wikipedia.org/wiki/Botanical_code), and what with that racy Scandinavian Mr Linnaeus’ overtly sexually charged plant classification system (<http://www.nytimes.com/2007/05/23/nyregion/23linnaeus.html>), maybe botany is not such a suitable pastime for the gentler sex – or those otherwise of a nervous or sensitive disposition . . . ?

Image: [Wikimedia Commons](#).

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Chaffey N. 2012. Plant Cuttings, April. *Annals of Botany* 109(5): iv–vi.