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Editorial

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The first anniversary of *Phytotaxa* in the International Year of Biodiversity

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Introduction

Mankind relies on the diversity of life to provide us with food, fuel, water, oxygen, medicine and other essentials, yet this biodiversity is being lost at a greatly accelerated rate because of careless human activity. This weakens the ability of living systems to resist growing threats such as climate change, creating greater poverty through degradation of many ecosystems, both terrestrial and marine.

The United Nations declared 2010 as the International Year of Biodiversity, with the aim of increasing global awareness of the intricate link between people and biodiversity—an emotional and intellectual connection that the growing urban population may have lost in spite of being entirely dependent on it. This is even the case for plant taxonomists. Our studies typically involve discoveries of species new to science, evolutionary relationships not earlier comprehended or previously unappreciated interactions of plants with other living organisms. Despite the loss of the connection between biodiversity and urban populations, it is heartening to note that some new species do achieve high levels of public attention and press coverage. Each year, for example, the International Institute for Species Exploration announces the Top 10 New Species (of animals, plants and other organisms) for the preceding year (http://species.asu.edu/Top10), providing examples of exciting new discoveries. Two plants were included on the 2009 list: a new pitcher plant from the Philippines, *Nepenthes attenboroughii* A.S.Rob., S.McPherson & V.Heinrich in Robinson *et al*. (2009: 196), and a previously undescribed yam which is harvested locally in Madagascar, *Dioscorea orangeana* Wilkin in Wilkin *et al*. (2009: 462). In the previous year, the new plant species chosen were the “suicide palm”, *Tahina spectabilis* J.Dransf. & Rakotoarinivo in Dransfield *et al*. (2008: 84) and a caffeine-free coffee from Cameroon, *Coffea charrieriana* Stoff. & F.Anthony in Stoffelen *et al*. (2008: 68).

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Over the past decades, the process of discovery has largely shifted from outdoors to indoors, from fieldwork in nature to laboratories and offices. The focus has shifted to modern methods in molecular phylogenetics, and more recently to DNA barcoding, sometimes resulting in the loss of the scientists' connection with the living organisms they study. Decline in plant collecting is already interrupting information flow from outdoors to indoor research facilities (Prather *et al.* 2004), and herbaria around the world find themselves threatened by economic pressure (Dalton 2003). Moreover permits to study organisms in nature are often complicated by local, national and international regulations that aim to prevent biopiracy and unwarranted exploitation, but instead limit the ability to carry out fundamental research (e.g. Roberts & Solow 2008), decreasing the knowledge of conservation status and distribution of many species. Nevertheless, Bebber *et al*. (2010) estimated that the world's herbaria and botanical gardens might house more than half of the plant species remaining unknown to science. Herbarium specimens are much more than historical records of expeditions by the great naturalists of the past; they also represent the occurrence of a species at a certain place and time and are an important resource for the modelling of past, present and future species distribution. Among other uses, herbarium specimens are often sources of DNA for molecular systematics (Erkens *et al.* 2008, Lehtonen & Christenhusz 2010). It has been argued that the speed of new systematics has left traditional botany behind, resulting in a gap between evolutionary understanding and classification (Franz 2005). It has also been argued that with limited financial support for fieldwork, herbarium curation and study, or training of botanists to make identifications and the information content of natural history collections is being eroded at a steady pace (Wheeler 2004). In contrast, others (Hebert & Gregory 2005) have pointed out that the funding used to finance molecular studies, particularly DNA barcoding, is not draining away resources that would otherwise fund the traditional activities associated with herbaria. These new activities have in fact brought additional resources into herbaria for the handling of specimens and their study.

To help overcome these conceptual problems, a rapid and easily accessible forum has been needed for research covering descriptions of new species, revisionary taxonomy, floristics, nomenclatural transfers, and other fundamental topics in botany. *Phytotaxa* has from the start adopted a policy of including cited taxonomic publications in the references, a policy one might consider as a standard in modern scientific literature, but actually rarely implemented in botanical taxonomy in the past (Christenhusz *et al.* 2009). The exclusion of taxonomic literature in references has resulted in low impact factors for taxonomic literature, and thus these articles have never received the scientific status they deserve. Over time, this change in citation hopefully will help increase the value of descriptive taxonomy, when science is only measured according to impact factor. After all, molecular systematics, DNA barcoding or any other branch of biology cannot thrive without accurate naming and descriptions of organisms providing the link between laboratory and nature.

Although, major advances have been made in our understanding of the relationships of higher groups of plants to each other (APG III 2009, Chase & Reveal 2009), studies on botanical diversity are still vital in understanding the distribution of species, locating diversity hotspots, and enhancing their conservation. In September 2009, *Phytotaxa* was launched to accelerate publication of botanical nomenclature, taxonomy, systematics and other studies (Christenhusz *et al.* 2009). The main reason for initiating this new journal was to speed up the process of publication of plant taxonomy. Many conventional botanical journals have recently decided not to publish new taxa, monographs, revisions or checklists, because of the low impact factors of these articles. Additionally journals that do publish such articles either have limited page numbers or a large backlog, resulting in a lengthy period between acceptance and publication of an article. Articles submitted to *Phytotaxa* are typically published within a few weeks after acceptance (Table 1), which is possible because *Phytotaxa* follows a rapid review, unlimited pages, simultaneous online and print model of publication proven immensely successful by its sister journal, *Zootaxa* (Zhang 2008), and currently imitated by several other journals (e.g. *Biorisk, Neobiota, Phytokeys, Zookeys*), all contributing greatly to the acceleration of biological systematics, species invasions and taxonomy.

TABLE 1. Delay in publication (days) after acceptance for papers published in *Phytotaxa* in 2009 and 2010.

	Average	Minimum	Maximum
2009	35	10	76
2010	54*	11	142
Pooled	50	10	142

* The processing of several monographic works and a special volume in 2010 seems to have contributed to an increase of delay in 2010 (compared to that in 2009).

Statistics

Since its initiation in September 2009, *Phytotaxa* has published 14 volumes containing 86 articles, five of which are volumes consisting of a large single article. In these articles, 56 new taxa and 75 new combinations were proposed. There are special issues on bryophytes (in association with the Early Land Plants Today project, Von Konrat *et al.* 2010a, 2010b) and *Hypericum* (Carine & Christenhusz 2010, Robson 2010a, 2010b). The checklist of suprafamilial names by Reveal (2010) also received special attention.

Four articles dealt with fungi, two with algae and 19 with bryophytes. In addition 61 articles concerned vascular plants, of which eight were about ferns, one about gymnosperms and 52 about flowering plants (one on magnoliids, 16 monocots and 35 eudicots).

Papers were published on average 50 days after acceptance (Table 1), and large monographic papers and special volumes took longer to process than average papers.

An update on individual groups

Fungi

Even though fungi are not plants, they are covered by the International Code of Botanical Nomenclature (ICBN; McNeill *et al.* 2006) and are included in the remit of *Phytotaxa*. Chapman (2009) counted a global total of ca. 99,000 species of fungi currently described, but he estimated a total of 1,500,000 species to exist in nature, which leaves the majority of species still unknown. In *Phytotaxa* there have until now been few contributions to the taxonomy of fungi (Harmaja 2009, 2010, Pressel *et al.* 2010, Zhuang *et al.* 2010), but currently an article describing one hundred new species of lichenised fungi is in press (Lumbsch *et al.*). This group, the so called lichens is one of the most successful groups of fungi, forming associations with algae and cyanobacteria. Based on the sensitivity of these symbiotic organisms, lichens are important bioindicators for different kind of disturbance, including air pollution, forest health and soil quality. Our knowledge of the diversity of lichens is poor and moreover the circumscription of species in lichenised fungi has been largely based on few morphological characters. There is a growing body of evidence that these concepts underestimate the number of existing species. Additional studies employing morphological, chemical and molecular data are necessary to fully understand the diversity of these vulnerable organisms.

Algae

Two articles dealt with algae. One dealt with the distribution of a *Cladophora*, a green alga, along the coast of Brazil (De Souza Gestinari *et al.* 2010), and the second dealt with diatoms (Pearce *et al.* 2010).

Diatoms (Bacillariophyta) are somewhat difficult to place in the plant kingdom, but they are usually considered to be algae because they are autotrophic and photosynthetic (Seckbach & Kociolek in press). Recent phylogenetic analyses place these unicellular, eukaryotic organisms among the stramenochromes, a subgroup of stramenopiles (Liepe *et al.* 1994). The stramenochromes are a diverse group of organisms; it is

assumed that 'the autotrophic stramenopiles (represented in the molecular data bases by diatoms, phaeophytes, xanthophytes, eustigmatophytes, chrysophytes and synurophytes) have a common algal ancestor. They can be tentatively distinguished from other algae by the possession of a chloroplast with a three-thylakoid girdle lamella' (Liepe *et al.* 1994), so for the time being the scientists studying diatoms may still be considered botanists.

It has been estimated that around 15,000 living species of diatoms have been described, with an additional 5,000–8,000 fossil species, but these numbers are likely to be underestimated. The total number of species is a wild guess, but an estimate somewhere in the region of 200,000 species seems reasonable (Williams & Reid 2006). In the International Year of Biodiversity, 2010, roughly 75 new diatom taxa have been described, compared to over 400 in 2009 (Fourtanier & Kociolek 2010). This is because 2009 saw several major monographs and revisions published, suggesting that it is these kinds of efforts, focusing on existing collections, which yield most new taxa (Bebber *et al.* 2010). Many new diatom taxa are described as part of a more general effort, usually ecological or palaeo-ecological studies of particular regions, rather than thorough revisions of a certain family or genus. These yield new taxa relevant to the region, fewer in number but as significant in terms of discovery as the monographic response. Regardless of speculations concerning total number of diatom species still to be published, the diversity of diatoms is being documented, and *Phytotaxa* has an obvious role to play in this endeavour.

Bryophytes

Phytotaxa is an influential scientific medium for the group of green land plants commonly referred to as bryophytes, which include the three lineages: liverworts, hornworts and mosses (recognized as subclasses; Chase & Reveal 2009). Together, bryophytes are the largest group of land plants after flowering plants and they are pivotal in our understanding of early land plant evolution. Bryophytes are important components of the vegetation in many regions of the world and have great ecological and biological significance. There were a total of 19 articles or monographs published on bryology since the launch of *Phytotaxa*. Significantly, *Phytotaxa* 9 was dedicated bryophytes, co-edited by our three editors for bryophytes. The issue contained 13 papers from 35 authors, and all papers can be accessed freely (Open Access) on the *Phytotaxa* website. The papers included a broad array of disciplines and subjects, including biogeography, checklists and distribution, conservation, delimitation of species, fungal symbioses, molecular phylogenetics, species richness and systematics. In the important International Year of Biodiversity, 2010, the reflections and syntheses presented in this special issue were of particular importance. The editors hoped the broad scope of papers would have wide appeal and enhance interest beyond the study of liverworts, mosses and hornworts. Issue 9 also announced the partnership between the international consortium Early Land Plants Today and *Phytotaxa*. Three papers have been published as part of this new partnership, including the first in a series synthesizing nomenclature, taxonomy and distribution for liverwort and hornworts taxa, entitled "Early land plants today: taxonomy, systematics and nomenclature of Gymnomitriaceae" (Váňa *et al.* 2010), which was the most successful paper in terms of access with over 5575 downloads in its first week after publication. The papers "20,000 species and five key markers: The status of molecular bryophyte phylogenetics" (Stech & Quandt 2010) and "Fungal symbioses in bryophytes: new insights in the Twenty First Century" (Pressel *et al.* 2010) were classified as 'hot' papers and were also frequently downloaded.

Pteridophytes

Spore-producing vascular plants (also called 'monilophytes and lycophytes', 'seed-free' plants, or simply 'ferns and club mosses') were well-represented in *Phytotaxa* from the first volume in 2009. Ferns are a relatively small group with an estimated 15,000 species (Chapman 2009), but the concepts of familial and generic delimitation has been in flux for the last century. It now appears that, with the advance of molecular techniques and phylogenetic analyses, a consensus on at least the familial concepts has been reached (Smith *et al.* 2008, Christenhusz *et al.* 2011b, in press). Articles in *Phytotaxa* mostly proposed new combinations of ferns to accommodate species in their currently accepted genera following recent molecular phylogenetic

studies (e.g. Christenhusz 2009, 2010, Yesilyurt & Schneider 2010). In addition, several new taxa have been described (Lehnert 2009, 2010, Moguel Velázquez & Kessler 2009, Yesilyurt & Schneider 2010), providing a fair contribution to pteridology.

Gymnosperms

Gymnosperms are a small group of seed plants that is relatively well known taxonomically. Only a single article in *Phytotaxa* dealt with this group in which a new species of the cycad genus *Zamia* (Zamiaceae) was described. In 2011 a review of gymnosperm classification and bibliography will be published (Christenhusz *et al.* 2011a, in press).

Magnoliids

Only a single article (Turner 2010) dealt with this small group of flowering plants. This article dealt with the genus *Polyalthia* (Annonaceae) in which a new combination and a couple of types were proposed. *Phytotaxa* is frequently used to validate new combinations and typification of taxa; these articles are often not of a broad interest to the general biological community but they are of the utmost importance in the correct application of names.

Monocots

Like almost all other groups of land plants, new species of monocots are commonplace, even in popular and showy groups, such as Liliaceae and Orchidaceae. A new species of *Tulipa* (Liliaceae), *T. albanica* Kit Tan & Shuka in Shuka *et al.* (2010: 19), was described from Albania, and several new species of orchids were described from the Neotropics (Batista *et al.* 2010, Bennett & Christenson 2009). Some new combinations in orchids were also published and a new species of *Eleocharis* (Cyperaceae) was recorded (Hinchcliff *et al.* 2010). Bromeliads figured prominently among the monocot papers, including revisions of genera (Luzada & Wanderley 2010), new species (Manzanares & Gouda 2010) and floristic treatments (Versieux *et al.* 2010).

Enthusiasm for *Phytotaxa* in the palm community has been striking. Though only two short papers have been published in the first year (Henderson & Dung 2010, Henderson *et al.* 2010), three monographs of major groups are at various stages in the editorial process and will appear in 2011. Clearly, there is a demand not only for a journal that can deliver a rapid turnaround for basic accounts of new species and so on, but also for a flexible venue for delivering substantial taxonomic works that other journals might find hard to accommodate. These monographs have been presented in an assortment of styles. *Phytotaxa* is still finding its feet in terms of the formatting standards it has to assert across the board, but the fact that the journal is *not* highly proscriptive is a big attraction to our contributors. They appreciate that *Phytotaxa* gives the author considerable freedom to deliver taxonomy in a manner appropriate to each individual case.

Eudicots

This large and diverse group of vascular plants receives a lot of attention by botanists, and numerous new species are annually described worldwide. There have been numerous contributions in *Phytotaxa* varying from a new parasite in the genus *Rafflesia* from the Philippines (Balete *et al.* 2010) to a revision of *Cousinia* in Kyrgyzstan (Sennikov 2010). New species were described in Asteraceae, Fabaceae, Hypericaceae, Malvaceae, Myrtaceae, Plantaginaceae, Rafflesiaceae, Rosaceae, Rubiaceae, Solanaceae, Urticaceae, Violaceae and Euphorbiaceae.

Euphorbiaceae are one of the largest plant families, including two of the largest genera, *Croton* and *Euphorbia*. Together, these include over 3,250 accepted species (Frodin 2004). Ongoing molecular phylogenetic projects on these two genera have identified numerous new taxa at both the species and subgeneric level (e.g. Caruzo *et al.* 2010, Riina *et al.* 2010, Van Ee & Berry 2011, etc.). This family is just another example that there will be many more plants to discover!

Conclusions

We believe that *Phytotaxa* has an important role to play in facilitating valid publication of the many new species of plants, fungi and other groups covered by the ICBN. The rapid publication, combined with thorough peer review, offered by *Phytotaxa*, contributes significantly to the documentation of botanical biodiversity. The end of the International Year of Biodiversity also sees the end of the first complete year of publication of *Phytotaxa*, and the publication of 14 issues. This level of submission and publication indicates that there is a clear need for a journal such as *Phytotaxa*, and if, as we expect, it follows a similar trajectory to *Zootaxa* in its early days (Zhang 2008), we look forward to a rapidly increasing rate of production of new issues as the journal gains increasing levels of visibility, acceptance and respect in the community.

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