



Accelerating biodiversity descriptions and transforming taxonomic publishing: the first decade of Zootaxa

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“Without question, one indisputable publishing success in the field of zoological nomenclature is the taxonomic mega-journal *Zootaxa*..... this publishing sensation has come from nowhere in 2001 to dominate the taxonomic publishing landscape as the world’s largest taxonomic journal.”

“*Zootaxa* has helped defragment the publishing landscape for zoological taxonomy, making taxonomy findable, and enabling the discipline to benefit from the network effects of increased collaboration.”

V. Smith (2010) *Systematic Biology* 59(6): 759

Zootaxa was launched ten years to help taxonomists overcome the taxonomic impediment by enabling them to describe biodiversity in a rapid and efficient way. The first paper on a new species of flat mite (Acari: Tenuipalpidae) was published in Zootaxa 1 on 28 May 2001 (Morales & Freire 2001). Unlike many regularly-scheduled journals, each paper in Zootaxa was separately issued and published without delay after acceptance by the editor, and there are no page charges or a small fee to support open access. In addition, Zootaxa offers the flexibility to publish manuscripts of any length, so long as they pass peer review. Many colleagues were excited and encouraged by the prospects of such a brand new journal and some of them joined as associate editors to facilitate rapid processing of manuscripts. The journal has met the needs of authors and sustained an early phase of very rapid growth (Figs 1–3),

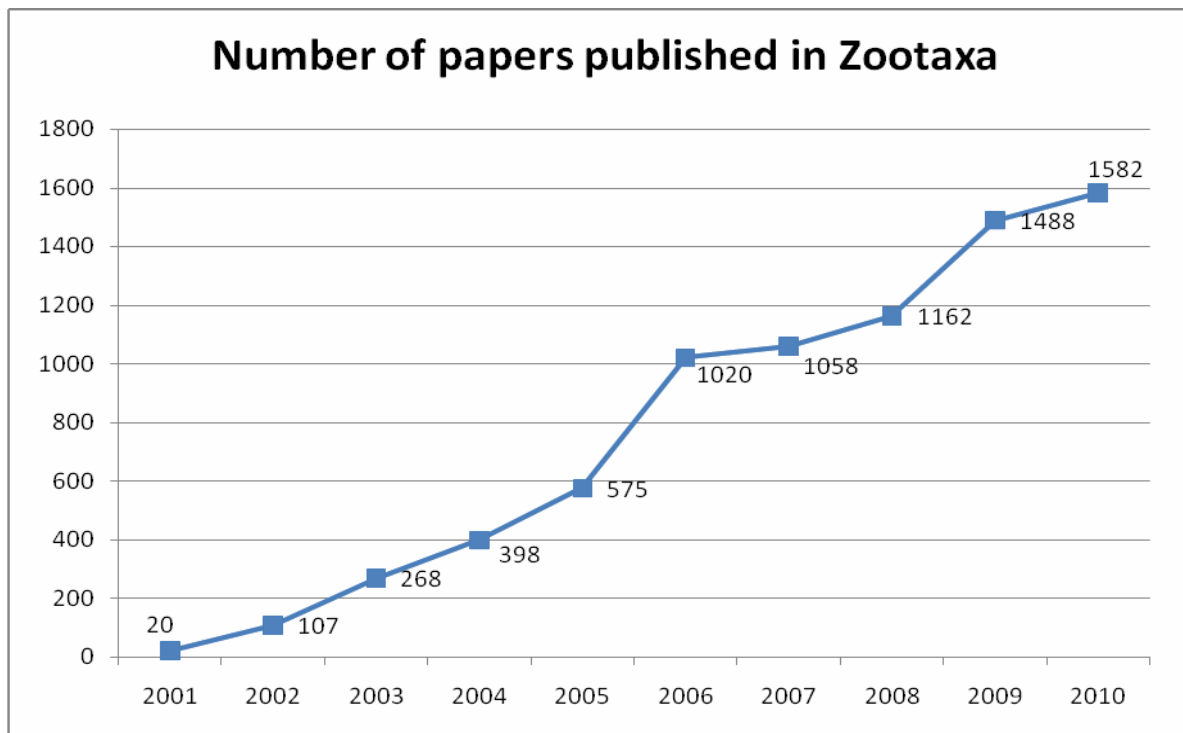


FIGURE 1 Number of papers published in Zootaxa from 2001 to 2010.

with issue/paper 1,000 published on 27 May 2005 (Rodiles-Hernández *et al.* 2005). In the first four years, over 1,100 authors from all over the world published 23,000 pages in Zootaxa (Zhang 2005). Thereafter, short papers of fewer than 60 pages were no longer issued separately because several papers were often published on the same day; instead, short papers were grouped to form standard issues of 60, 64, or 68 pages to save paper, printing and mailing costs, with relatively little effect on the speed of publication.

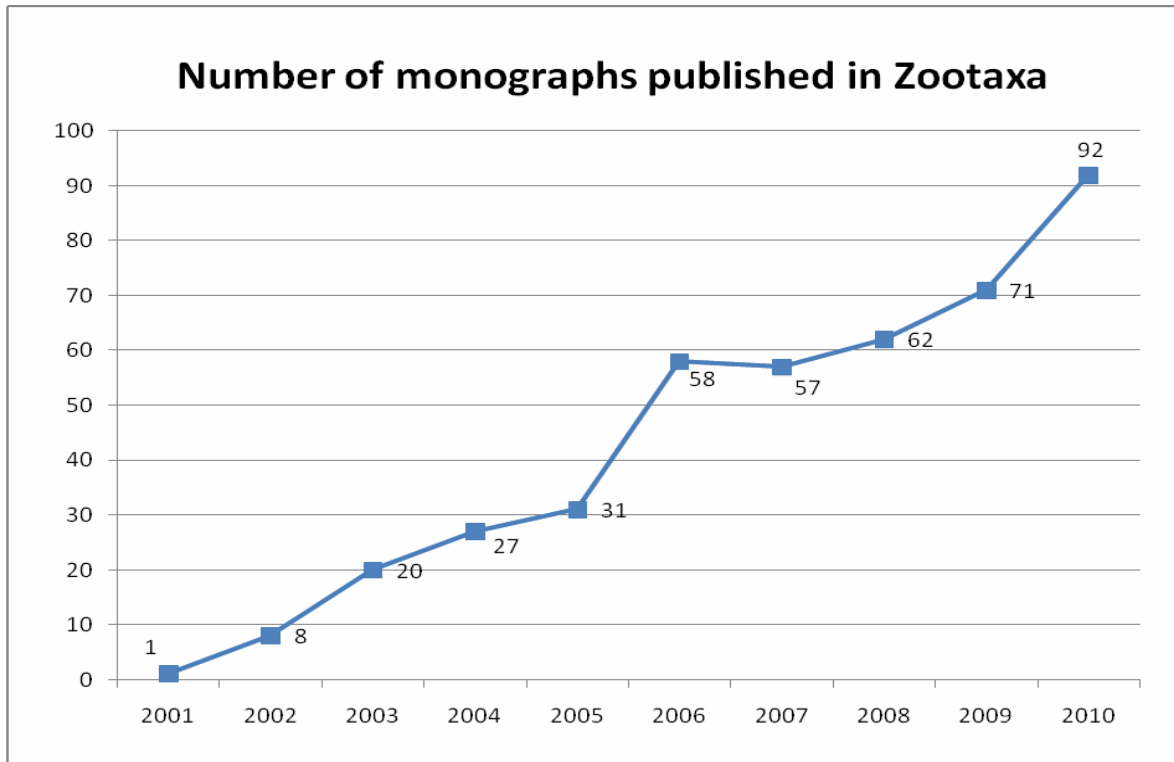


FIGURE 2. Number of monographs/books (60 or more pages) published in Zootaxa from 2001 to 2010.

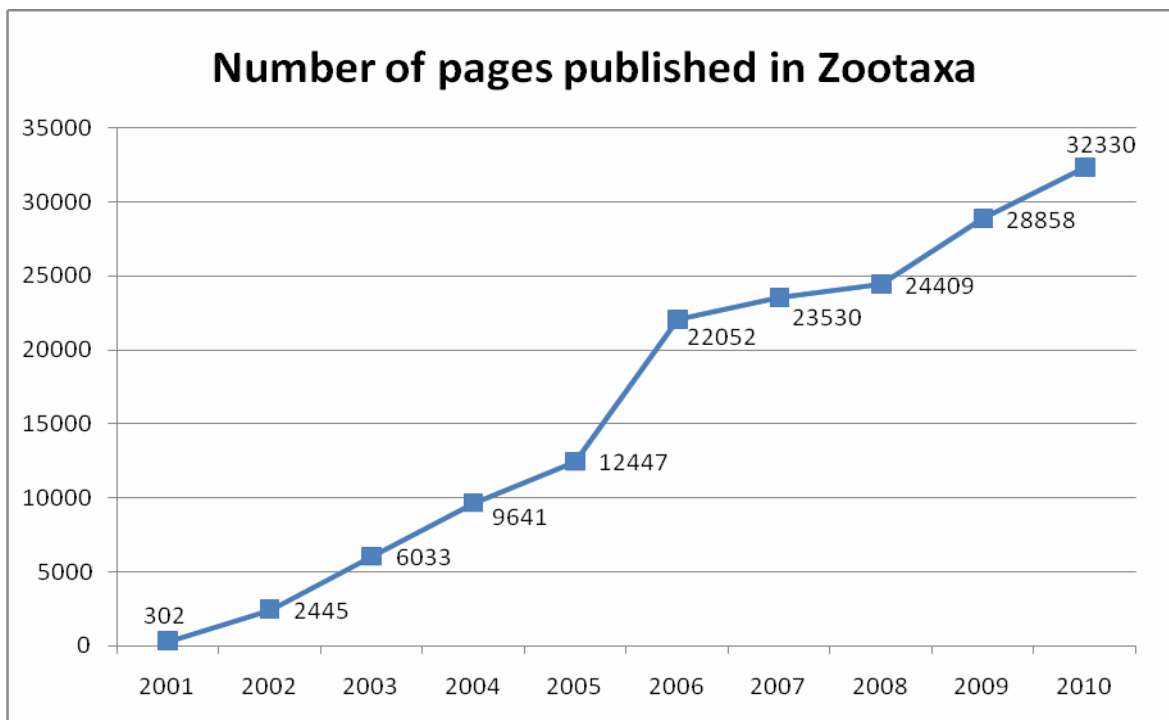


FIGURE 3. Number of pages published in Zootaxa from 2001 to 2010.

In 2004 alone, *Zootaxa* published 9,581 pages—much more than the combined total (8332 pages) published by ten other core journals (including the second largest journal in taxonomy: *Journal of Natural History*) in systematic zoology in the same year (Zhang 2006a). As world's largest journal in taxonomy and zoology, *Zootaxa* was selected by ISI in 2004 for coverage in *Science Citation Index Expanded* and *Journal Citation Reports*. Another period of rapid growth followed in the next couple of years and *Zootaxa* became a truly mega-journal in the field by publishing over 1,000 papers in more than 20,000 pages in 2006, with over one monograph each week (Zhang 2006b).

In the last four years, *Zootaxa* continued to grow steadily (Figs 1–3; Zhang 2008b). By the end of 2008, *Zootaxa* had published 1,968 issues in over 100,000 printed pages, with contributions from over 5,000 authors from over 100 countries around the world (Zhang 2008b, 2009). On the 8th anniversary, *Zootaxa* started to publish at least one issue daily except weekends and public holidays (Zhang 2009). In 2010, *Zootaxa* published 1,582 papers in 405 issues with a total of 32,330 pages (Zhang 2011).

In addition to the increase in size, *Zootaxa* also developed rapidly in its impact. Since its inclusion in the *Science Citation Index Expanded* in 2004, the number of citations to *Zootaxa* papers by SCIE-index journals had rapidly increased, especially in recent years (Fig. 4). *Zootaxa* was named a Rising Star six times during 2008–2009 by ScienceWatch.com based on its highest rate of increase in the number of citations among nearly 400 journals in the ISI Animal & Plant Science Field (a large field with many high impact journals). In August 2008, *Zootaxa* was a Featured Journal¹ from Essential Science Indicators for its citation achievements.

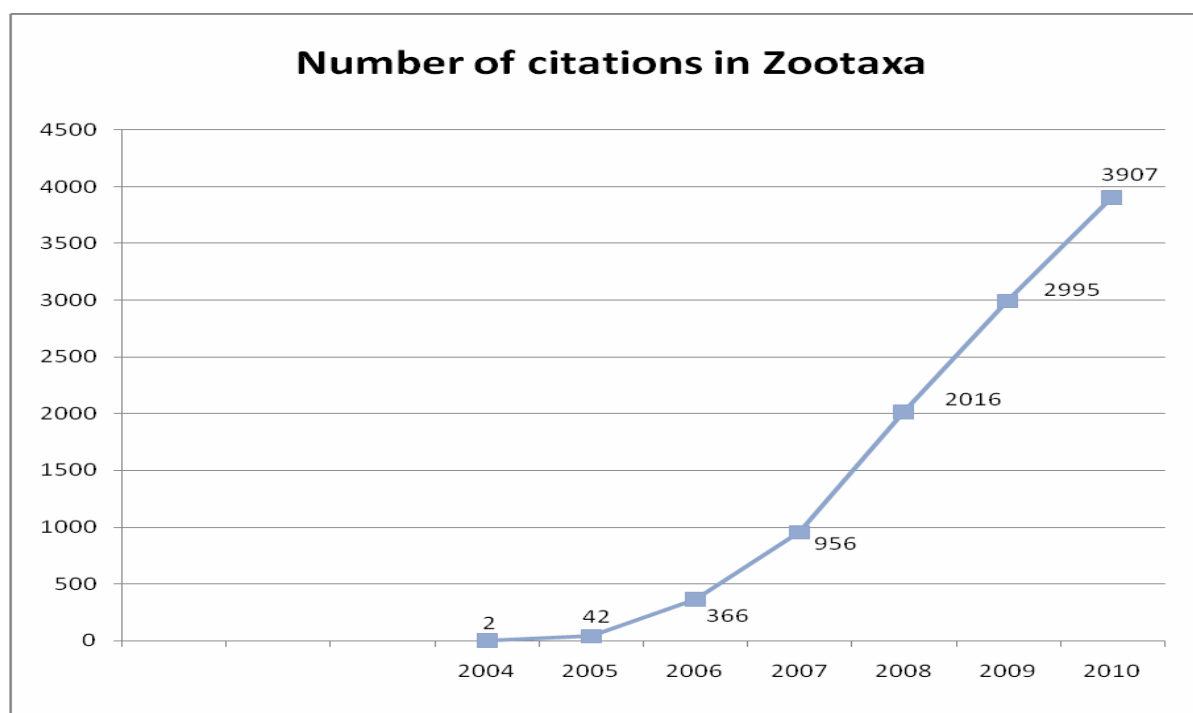


FIGURE 4. Number of citations of *Zootaxa* papers in ISI's *Science Citation Index Expanded* during 2004 to 2010 (data from Web of Science 21 May 2011). These are citations to *Zootaxa* papers indexed in SCIE only.

Zootaxa has established itself as the most important outlet for monographs in systematic zoology, with 459 monographs published so far. In 2010 alone, 92 monographs were published (Zhang 2011). Two significant large monographs are over 1,000 pages: the longest being a 1295-page monograph of Recent and fossil turrids (Mollusca: Gastropoda), which includes a world inventory of 11,350 species group taxa (Tucker, 2004), and the second largest being a 1064-page book by Taeger *et al.* (2010) on sawflies of the world, which provides references to the original descriptions and distributional data for 803 genera, 8,353 species and 161 subspecies. Another large checklist of catfishes (Ferraris 2007) is the most-cited papers in *Zootaxa*, with 142 citations in SCIE (as of 21 May 2011).

1. <http://sciencewatch.com/inter/jou/2008/08aug-jou-Zoo/>

Zootaxa is among the few scientific journals that are regularly covered by international news media² for important biodiversity discoveries. In May 2011 alone, Zootaxa was covered in the *National Geographic* twice for its new species: a blind, legless lizard *Dibamus dalaiensis* (Neang *et al.* 2011) reported in news on 12 May³ and a tiger stingray (Carvalho *et al.* 2011) reported in news on 6 May⁴.

Zootaxa is the journal of choice for many authors to publish their important discoveries. Zootaxa has featured prominently in TOP10 new species⁵ selected annually by a panel of international experts since 2007. In the last four years, 29 species of animals were selected (other 11 species being plants, fungi and microorganisms) and Zootaxa alone accounts for 38% of the top new animal species: a spectacular pink millipede *Desmoxytes purpureosa* Eng-hoff, Sutcharit & Panha, 2007; a rare frog *Philautus maia* Meegaskumbura, Manamendra-Arachchi, Schneider & Pethiyagoda, 2007; one of the most venomous snakes in the world *Oxyuranus temporalis* Doughty, Maryan, Donnellan & Hutchinson, 2007 and a dangerous box jellyfish *Malo kingi* Gershwin, 2007; the longest insect *Phobaeticus chani* Bragg in Hennemann & Conle, 2008; a pygmy seahorse *Hippocampus satomiae* Lourie & Kuitert, 2008; the world smallest snake *Leptotyphlops carlae* Hedges, 2008; a deep-reef fish *Chromis abyssus* Pyle, Earle & Greene, 2008; a carnivorous sponge *Chondrocladia (Meliiderma) turbiformis* Vacelet, Kelly & Schlacher-Hoenlinger, 2009; a pollinating cricket *Glomeremus orchidophilus* Hugel *et al.*, 2010; a new duiker *Philantomba walteri* Colyn *et al.*, 2010.

Zootaxa encourages and promotes open access of taxonomic literature. It is the world's largest source of open access papers in taxonomy, with nearly 1,600 papers published for open access during 2001–2010 (Fig. 5). On average, 20% of the papers in Zootaxa are for open access.

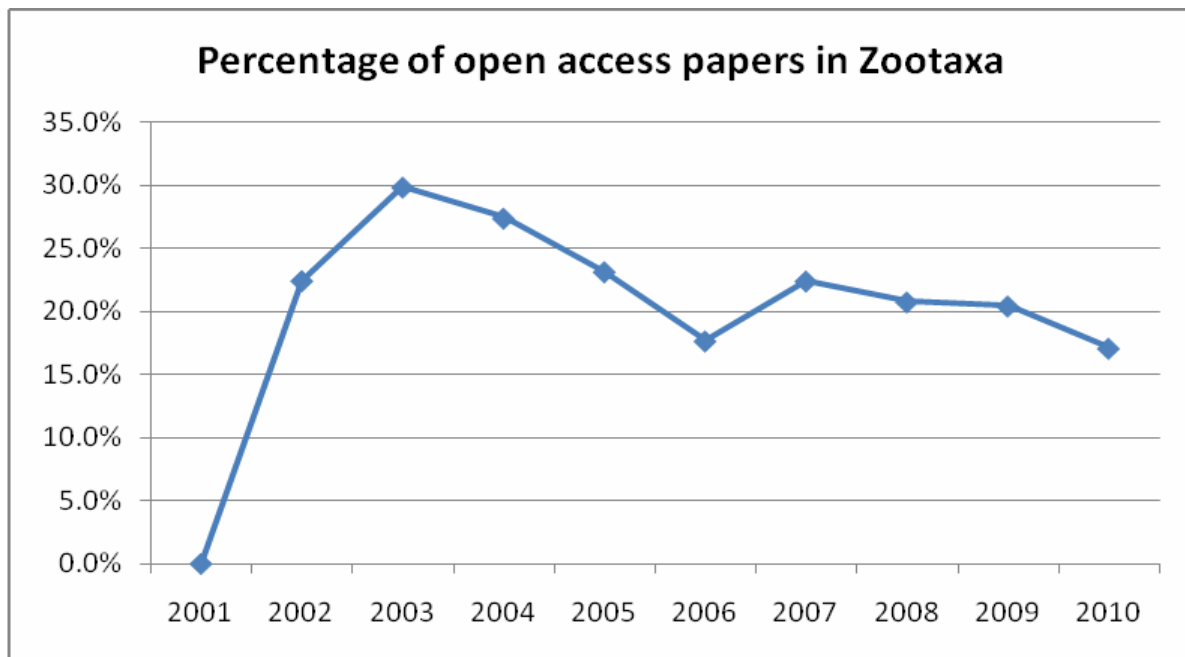


FIGURE 5. Percentage of open access papers in Zootaxa from 2001 to 2010.

Zootaxa's most significant contributions have been made towards describing world's unexplored biodiversity. During 2001–2010, the total number of new animal taxa fluctuated between 18,106 and 20,709 per year according to *Zoological Record* (Fig. 6A), whereas the number of new taxa published in *Zootaxa* increased rapidly. As a result, the proportion contributed by Zootaxa increased rapidly over the years and reached about 20% in 2010 (Fig. 6B).

2. <http://news.google.com/news/search?aq=f&pz=1&cf=all&ned=nz&hl=en&q=zootaxa>

3. <http://news.nationalgeographic.com/news/2011/05/110512-new-species-found-blind-legless-lizard-cambodia-animals-science/>

4. <http://news.nationalgeographic.com/news/2011/05/110506-new-tiger-stingray-amazon-pet-fish-animals-science/>

5. <http://species.asu.edu/Top10>

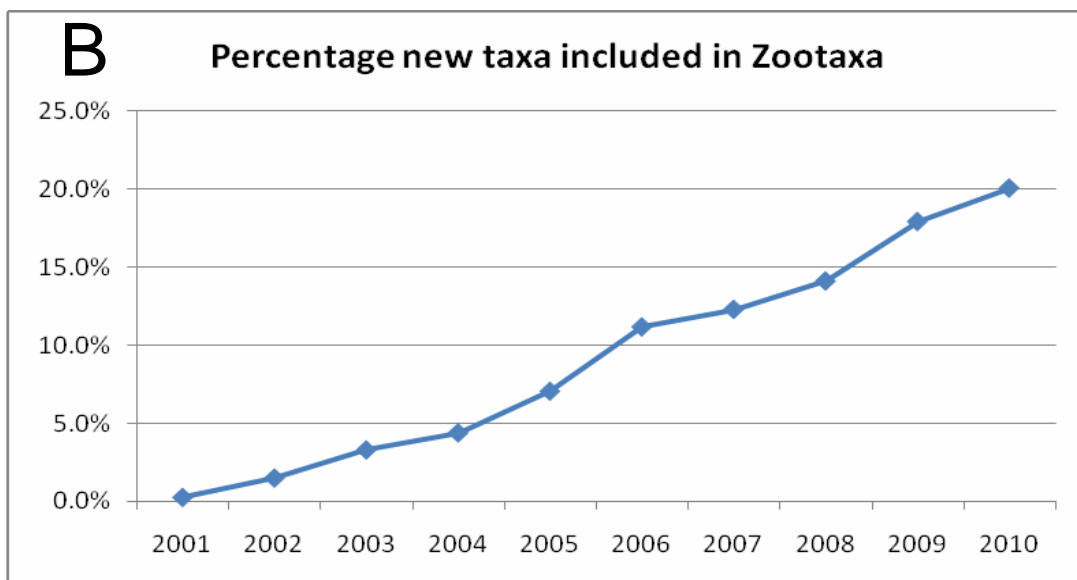
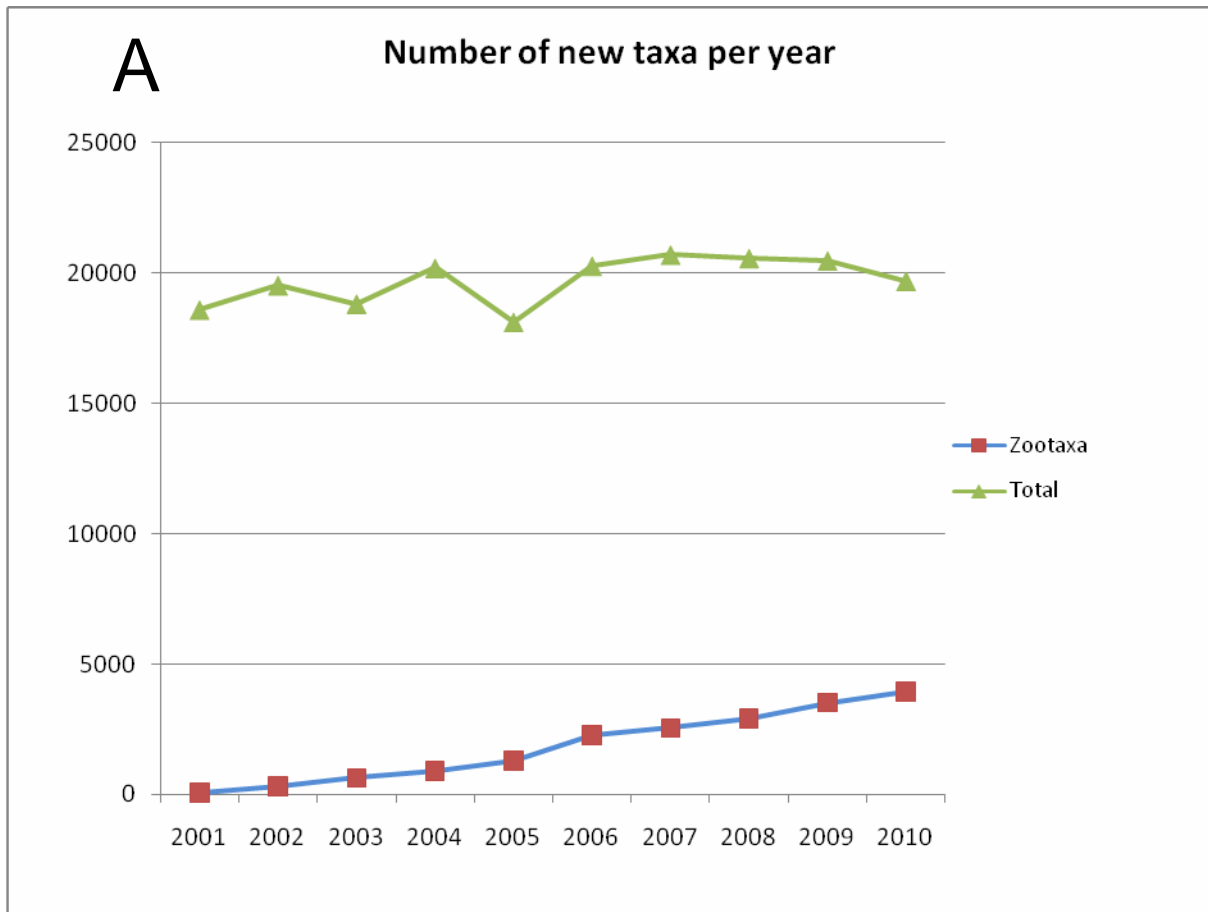


FIGURE 6. Growth of *Zootaxa* in the number of new taxa published from 2001 to 2010: **A.** Total number of new taxa published per year in *Zootaxa* versus total of new taxa of animals per year in all publications indexed in *Zoological Record* (ZT). *Zootaxa* data (2001–2009) were provided by Nigel Robinson in 2010; *Zootaxa* data (2010) were from Zhang (2011) with new names proposed for old taxa not counted. Total number of new taxa from ZR were obtained from *Index to Organism Names* published by Thomson Reuters online⁶ (viewed on 21 May 2011); animals here include Protozoa indexed in *Zoological Record*. These numbers include new names and new taxa. The 2010 data from *Zoological Record* are incomplete at the moment and estimated by the average of the last nine years. **B.** *Zootaxa*'s new taxa per year as a proportion of the total new taxa per year in ZR.

6. <http://www.organismnames.com/metrics.htm?page=graphs>

In just ten years, *Zootaxa* has transformed the landscape of taxonomic publishing. Its new model of publishing has inspired a generation of new rapid journals in taxonomy—some prominent and successful ones include *ZooKeys* and *Phytotaxa*. *Zootaxa* continues to innovate. On 1 Jan. 2008—the 250th anniversary of the publication of *Systema Naturae* 10th edition (Linnaeus 1758)—*Zootaxa* published a landmark cybertaxonomy paper (Pyle *et al.* 2008) showcasing the utilization of embedded links and a variety of other cybertaxonomic tools (e.g. XML) to enhance the quality and utility of electronic publications (Zhang 2008a). This opens a new chapter in taxonomic publishing, with a focus on linkages between taxonomic data in primary literature and online databases. Pyle *et al.* (2008) was followed by several other papers in *Zootaxa* (e.g. Deans & Kawada, 2008; Johnson *et al.* 2008; Winter-ton 2009) and other journals (e.g. *ZooKeys*) that show what is now possible in modern scientific publishing.

Looking forward, the recent advance in cybertaxonomy has allowed new ways of presenting and publishing taxonomic information. Despite the fact that *Zootaxa* is published simultaneously online and in print, more and more libraries take only the electronic edition. There is rapidly increasing demand by the community for the codes of nomenclature to allow e-only publication of taxonomy, which requires, among other conditions, the permanent digital archiving for taxonomic publications so that they are preserved and available for future generations. *Zootaxa*, in collaboration with The Society for the Management of Electronic Biodiversity Data and other institutions (natural history museums, societies, publishers etc), will take a leading role in developing a non-profit international facility that will integrate cost-efficient online publishing and permanent digital archiving for all taxonomic publications. This will ensure a brighter future for *Zootaxa* in the next decade and more.

Acknowledgement

I am grateful to Nigel Robinson of *Zoological Record* (Thomson-Reuters, UK) for his help with data in Fig. 6, and Dr Bruce Halliday (CSIRO Ecosystem Sciences, Australia) for reading an early version of this manuscript and for comments. I also greatly appreciate the support and contributions of over 200 *Zootaxa* editors and more than 8,500 authors who have made *Zootaxa* a huge success.

References

- Carvalho, M.R. De, Sabaj Perez (Usa), M.H. & Lovejoy, N.R. (2011) *Potamotrygon tigrina*, a new species of freshwater stingray from the upper Amazon basin, closely related to *Potamotrygon schroederi* Fernandez-Yépez, 1958 (Chondrichthyes: Potamotrygonidae). *Zootaxa*, 2827, 1–30.
- Colyn, M., Hulselmans, J., Sonet, G., Oudé, P., de Winter, J., Natta, A., Nagy, Z.T. & Verheyen, E. (2010) Discovery of a new duiker species (Bovidae: Cephalophinae) from the Dahomey Gap, West Africa. *Zootaxa*, 2637, 1–30.
- Deans A.R. & Kawada R. (2008) *Alobevania*, a new genus of neotropical ensign wasps (Hymenoptera: Evaniidae), with three new species: integrating taxonomy with the World Wide Web. *Zootaxa*, 1787, 28–44.
- Doughty, P., Maryan, B., Donnellan, S.C. & Hutchinson, M.N. (2007) A new species of taipan (Elapidae: Oxyuranus) from central Australia. *Zootaxa*, 1422, 45–58.
- Ferraris, C.J. (2007) Checklist of catfishes, recent and fossil (Osteichthyes : Siluriformes), and catalogue of siluriform primary types. *Zootaxa*, 1418, 1–628.
- Enghoff, H., Sutcharit, C. & Panha, S. (2007) The shocking pink dragon millipede, *Desmoxytes purpurosea*, a colourful new species from Thailand (Diplopoda: Polydesmida: Paradoxosomatidae). *Zootaxa*, 1563, 31–36.
- Gershwin, L.A. (2007) *Malo kingi*: A new species of Irukandji jellyfish (Cnidaria: Cubozoa: Carybdeida), possibly lethal to humans, from Queensland, Australia. *Zootaxa*, 1659, 55–68.
- Hedges, S.B. (2008) At the lower size limit in snakes: two new species of threadsnakes (Squamata: Leptotyphlopidae: Leptotyphlops) from the Lesser Antilles. *Zootaxa*, 1841, 1–30.
- Hennemann, F.H. & V.O. Conle. (2008) Revision of Oriental Phasmatoidea: The tribe Pharnaciini Günther, 1953, including the description of the world's longest insect, and a survey of the family Phasmatidae Gray, 1835 with keys to the subfamilies and tribes (Phasmatoidea: "Anareolatae": Phasmatidae). *Zootaxa*, 1906, 1–316.
- Hugel, S., Micheneau, C., Fournel, J., Warren, B.H., Gauvin-Bialecki, A., Pailler T., Chase, M.W. & Strasberg, D. (2010) *Glomeremus* species from the Mascarene islands (Orthoptera, Gryllacrididae) with the description of the pollinator of an endemic orchid from the island of Réunion. *Zootaxa*, 2545, 58–68.
- Johnson, N.F., Masner, L., Musetti, L., van Noort, S., Rajmohana, K., Darling, D.C., Guidotti, A. & Polaszek, A. (2008) Revision of world species of the genus *Heptascelio* Kieffer (Hymenoptera: Platygastroidea, Platygastriidae). *Zootaxa*, 1776, 1–51.

- Linnaeus, C. (1758) *Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Editio decima, reformata. Tomus I. Laurentii Salvii, Holmiae*, 828 pp.
- Lourie, S.A. & Kuitert, R.H. (2008) Three new pygmy seahorse species from Indonesia (Teleostei: Syngnathidae: Hippocampus). *Zootaxa*, 1963, 54–68.
- Meegaskumbura, M., Manamendra-Arachchi, K., Schneider, C.J. & Pethiyagoda, R. (2007) New species amongst Sri Lanka's extinct shrub frogs (Amphibia: Rhacophoridae: Philautus). *Zootaxa*, 1397, 1–15.
- Moraes, G.J. De & Freire, R.A.P. (2001) A new species of Tenuipalpidae (Acari: Prostigmata) on orchid from Brazil. *Zootaxa*, 1, 1–10.
- Neang, T., Holden, J., Eastoe, T., Seng, R., Ith, S. & Grismer, L.L. (2011) A new species of *Dibamus* (Squamata: Dibamidae) from Phnom Samkos Wildlife Sanctuary, southwestern Cardamom Mountains, Cambodia. *Zootaxa*, 2828, 58–68.
- Pyle, R.L., Earle, J.L. & Greene, B.D. (2008) Five new species of the damselfish genus *Chromis* (Perciformes: Labroidae: Pomacentridae) from deep coral reefs in the tropical western Pacific. *Zootaxa*, 1671, 3–31.
- Rodiles-Hernández, R., Hendrickson, D.A., Lundberg, J.G. & Humphries, J.M. (2005) *Lacantunia enigmatica* (Teleostei: Siluriformes) a new and phylogenetically puzzling freshwater fish from Mesoamerica. *Zootaxa*, 1000, 1–24.
- Smith, V. (2010) Book review: *Systema Naturae 250—The Linnaean Ark*. *Systematic Biology*, 59(6), 757–760.
- Taeger, A., Blank, S.M. & Liston, A.D. (2010) World Catalog of Symphyta (Hymenoptera). *Zootaxa*, 2580, 1–1064.
- Tucker, J.K. (2004) Catalog of Recent and fossil turrids (Mollusca: Gastropoda). *Zootaxa*, 682, 1–1295.
- Vacelet, J., Kelly, M. & Schlacher-Hoenlinger, M. (2009) Two new species of *Chondrocladia* (Demospongiae: Cladorhizidae) with a new spicule type from the deep south Pacific, and a discussion of the genus *Meliiderma*. *Zootaxa*, 2073, 57–68.
- Winterton S.L. (2009) Revision of the stiletto fly genus *Neodialineura* Mann (Diptera: Therevidae): an empirical example of cybertaxonomy. *Zootaxa*, 2157, 1–33.
- Zhang, Z.-Q. (2005) Notice from Chief Editor. *Zootaxa*, 1001, 64.
- Zhang, Z.-Q. (2006a) The first five years. *Zootaxa*, 1111, 68.
- Zhang, Z.-Q. (2006b) The making of a mega-journal in taxonomy. *Zootaxa*, 1358, 67–68.
- Zhang, Z.-Q. (2008a) Zoological taxonomy at 250: showcasing species descriptions in the cyber era. *Zootaxa*, 1671, 1–2.
- Zhang, Z.-Q. (2008b) Contributing to the progress of descriptive taxonomy. *Zootaxa*, 1968, 65–68.
- Zhang, Z.-Q. (2009) A daily journal of taxonomy for rapid species discovery. *Zootaxa*, 2120, 1–2.
- Zhang, Z.-Q. (2011) Describing unexplored biodiversity: *Zootaxa* in the International Year of Biodiversity. *Zootaxa*, 2768, 1–4.