



Contributions to ophiology in *Zootaxa* 2001–2020: patterns and trends

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There are currently 3,900 recognized, extant snake species belonging to 529 genera globally (Uetz *et al.* 2021; this study), making snakes one of the most diverse major groups of squamates. Of the 665 currently recognized species that were described between 2001 and 2020 (a ~17% increase in total species), ~34% of these (226 species) were described in *Zootaxa*. This number does not include species resurrected from synonymy. The other ~66% (439) species were described in 105 other journals, bulletins or books (Fig. 1a). Overall, the number of new snake species described every year is gradually increasing, and 40% of the new species described since 2011 were published in *Zootaxa*. Following *Zootaxa*, the second ranked journal, with 37 described species since 2001, is *Herpetologica* (Fig. 2). Anecdotally, the choice of *Zootaxa* as a publication outlet for new species descriptions by most authors is based on speed of publication post-acceptance, publication free of charge, relatively unconstrained number of papers published per year, relatively unconstrained manuscript length, expert section editors and reviewers, and consolidated scientometric parameters.

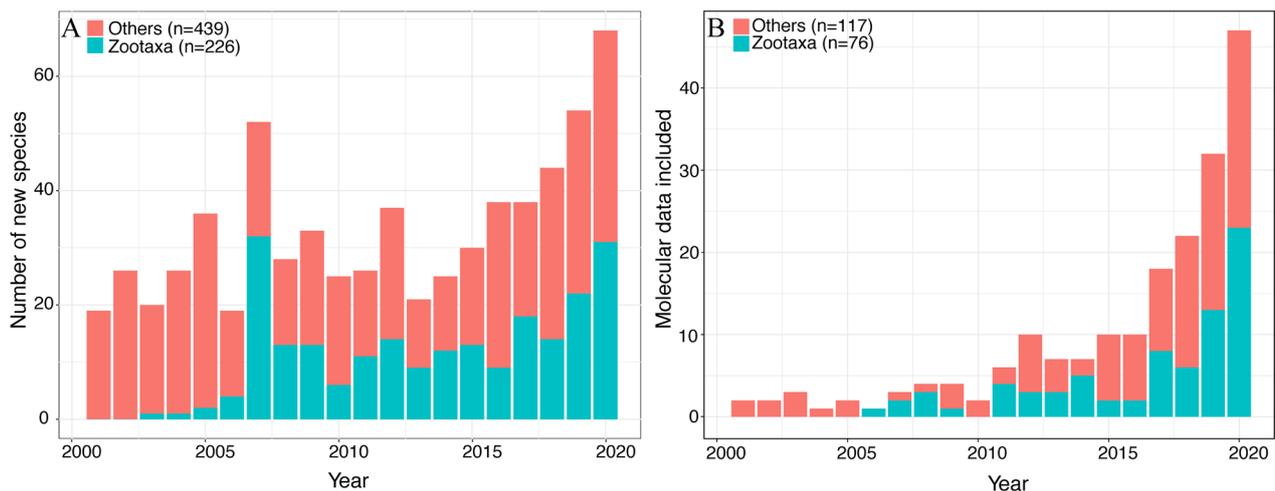


FIGURE 1. A) Number of newly described snake species per year between January 2001 and December 2020, B) Number of new snake species descriptions that included molecular data. Others = 105 other journals, bulletins and books pooled together.

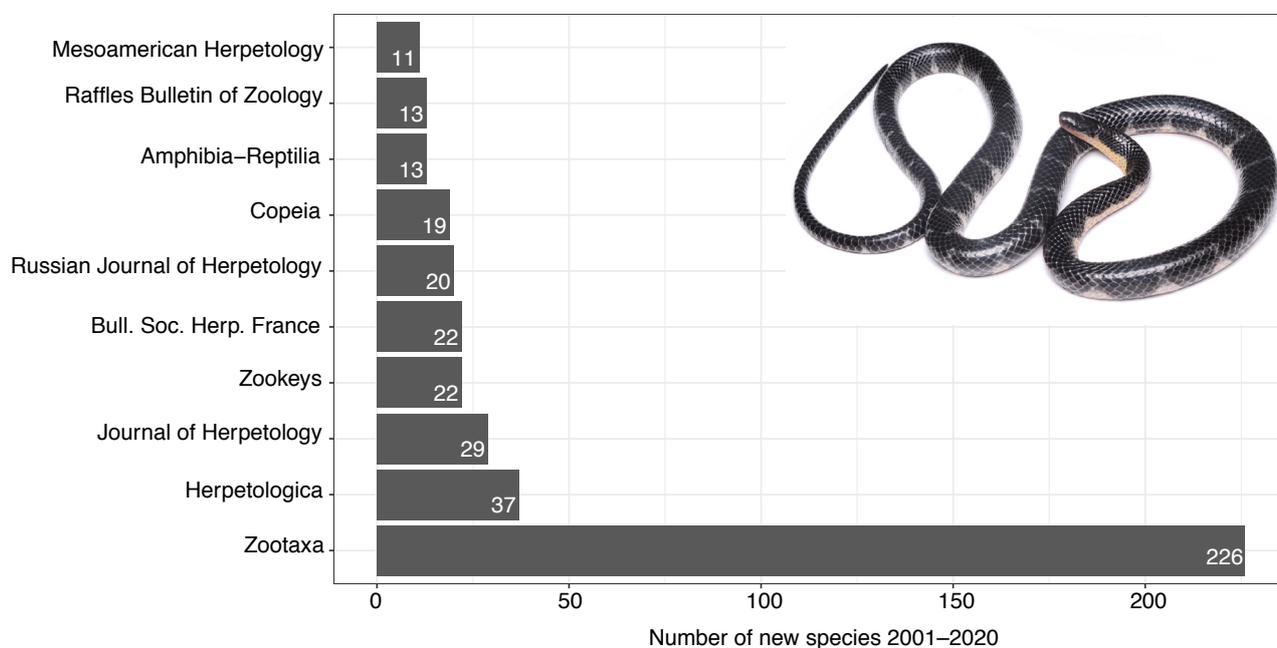


FIGURE 2. Top 10 journals where species of snakes were newly described between January 2001 and December 2020, except *Zookeys* (2008–2020) and *Mesoamerican Herpetology* (2014–2018). Inset image: *Smithophis atemporalis* (Samuel Lalronunga), described in *Zootaxa* in 2019.

Although more new snake species have been described in *Zootaxa* than in any other single publishing outlet since 2001, patterns and trends are similar (Table 1; Figs. 1,3). The vast majority (~42%; Fig. 3) of new snake species descriptions in the past 20 years were from the Americas, especially the Neotropics. Two higher taxa are the most frequently represented in the total 665 descriptions: Dipsadidae, endemic to the Americas (170 species) and the more cosmopolitan Colubridae (156 species). In the Asian tropics the highest number of species described per major taxon were for the Colubridae (48 species). *Zootaxa* publications substantially increased our knowledge of species richness of the following families, with more than 15% of their currently recognized species described in the journal: Cylindrophiiidae, Gerrhopilidae, Pareidae, Uropeltidae, and Xenodermidae. One hundred and twelve new snake species belonging to the families Viperidae and Elapidae have been described since 2001 (40 of which in *Zootaxa*) (Table 1). Many species in these two families are venomous and potentially harmful to humans, thus understanding the diversity and systematics of these groups may have important medical implications.

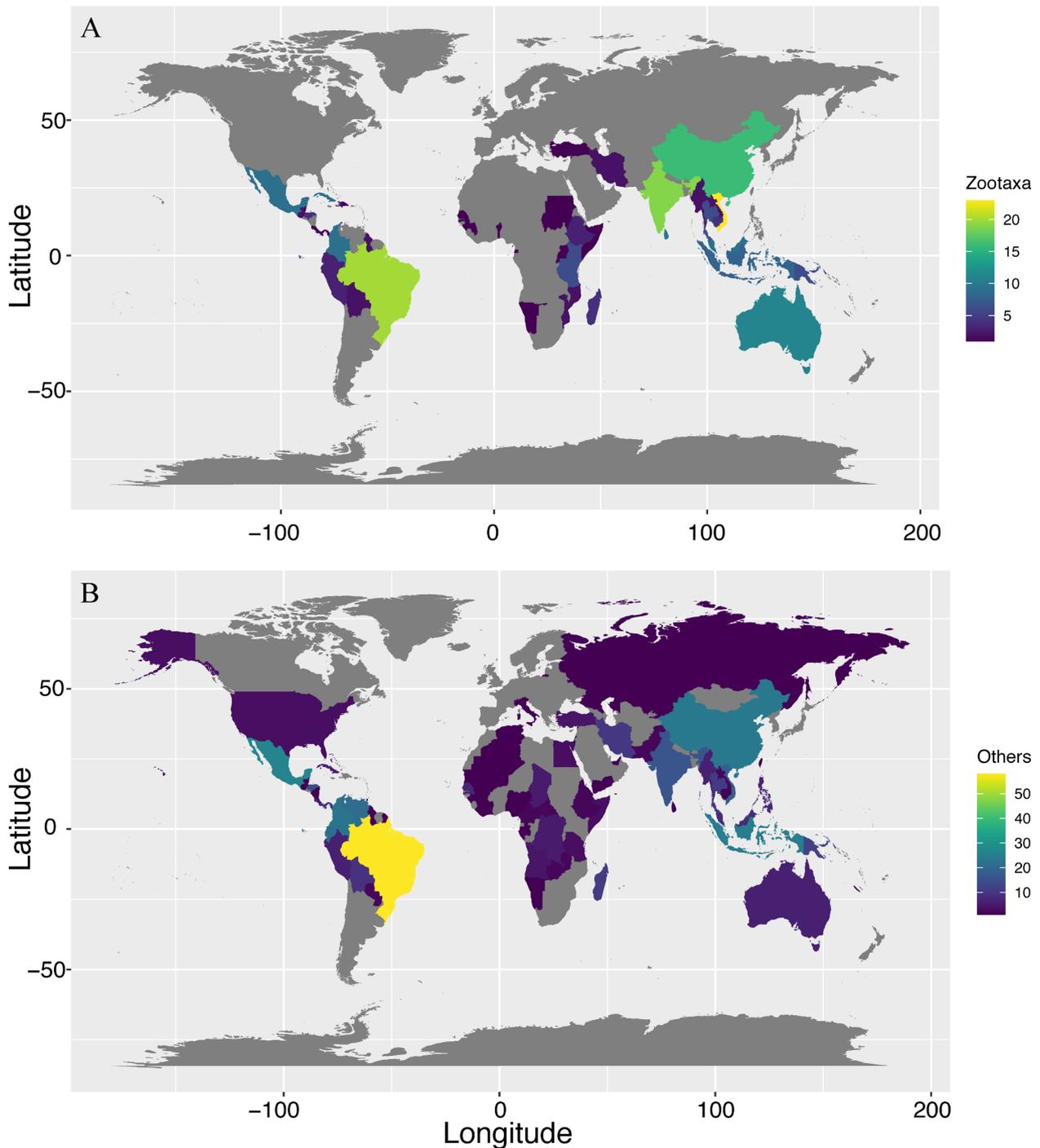


FIGURE 3. Distribution of newly described snake species between January 2001 and December 2020, based on type localities. **A)** *Zootaxa* and **B)** 105 other journals, bulletins and books pooled together.

Most new snake species descriptions since 2001 were based on external and/or internal morphology, but in recent years there has been an increase in the number of descriptive papers that have included molecular (typically DNA sequence) data (Fig. 1b). In the past few years the median number of authors per new species description has increased (Fig. 4). Geographic patterns of new snake species described in *Zootaxa* versus other outlets since 2000 are broadly similar (Fig. 3). However, other outlets have published new species descriptions from a wider range of countries (especially in the Americas and Africa), and *Zootaxa* has published a greater proportion of Asian and Australasian species (see examples in fig. 5).

TABLE 1. Number of new snake species per family described between January 2001 and December 2020 in *Zootaxa* and other outlets. Others = 105 other journals, bulletins and books pooled. Number of new species as a percentage of the total number of currently recognized species in each family are also reported (total based on Uetz *et al.*, 2021; this study). Family-level classification follows Zaher *et al.* (2019) and Burbrink *et al.* (2020).

	Anomalepididae	Anomochilidae	Atractaspidae	Boidae	Colubridae	Cylindrophiiidae	Dipsadidae	Elapidae	Gerrhopilidae	Homalopsidae	Lamprophiidae	Leptotyphlopidae	Natricidae	Pareidae	Psammophiidae	Pseudoxyrhopiidae	Pythonidae	Tropidophiidae	Typhlopidae	Uropeltidae	Viperidae	Xenodermidae
Others	4	1	1	4	108	1	138	25	1	10	12	22	14	8	4	9	2	6	19	2	47	1
Percentage %	20	33	2	6	12	7	17	7	5	18	14	16	6	24	7	10	5	17	5	3	13	4
<i>Zootaxa</i>	1	0	0	1	48	3	32	18	4	3	0	13	22	6	0	2	0	0	31	10	22	10
Percentage %	5	0	0	2	5	20	4	5	19	7	0	9	9	19	0	2	0	0	7	16	6	52

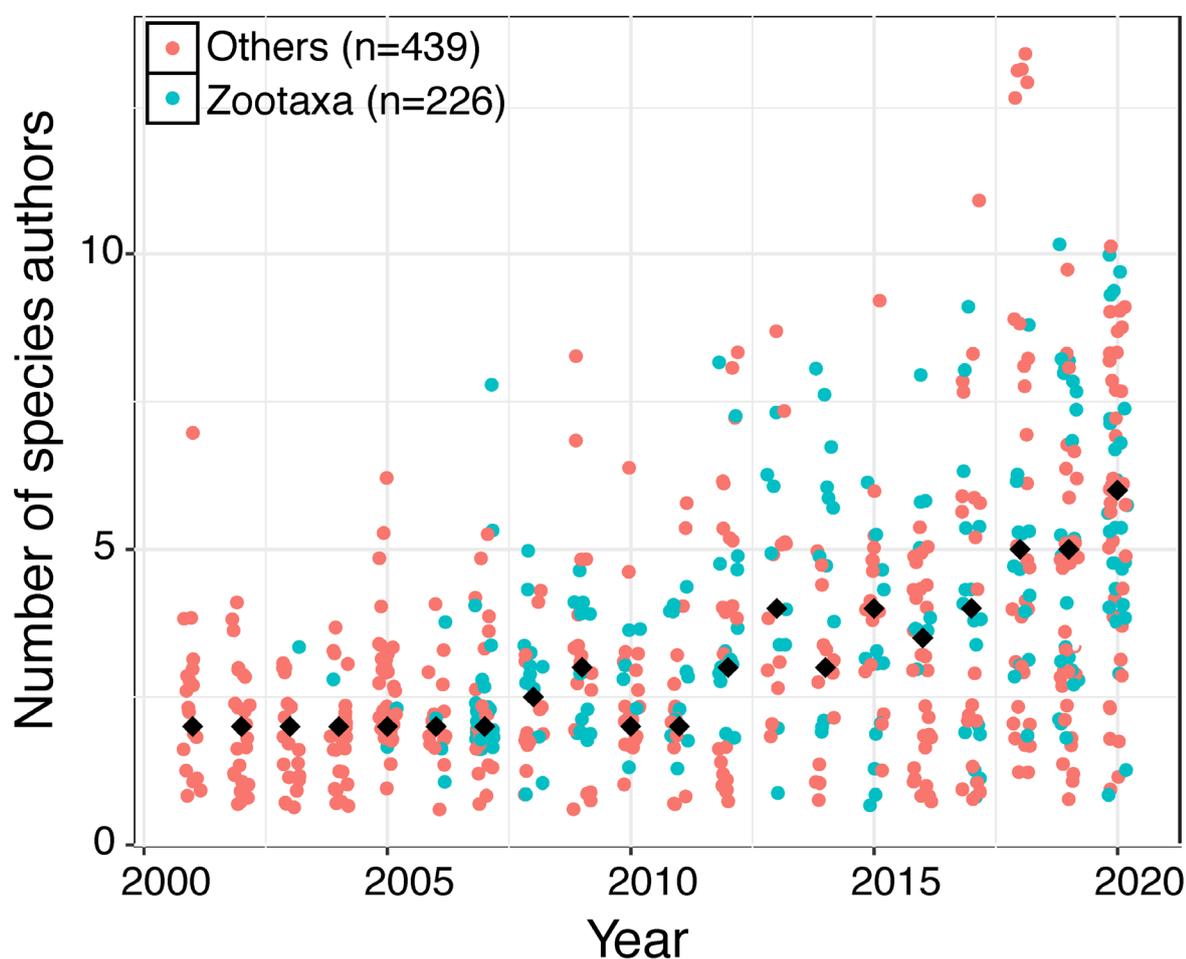


FIGURE 4. Number of authors per new species description published in *Zootaxa* and 105 other outlets has gradually increased in the past decade. Black diamonds indicate the median number (*Zootaxa* + Others) of authors per species per year.

Data are incomplete but, since 2007, rejection rates for new snake description manuscripts submitted to *Zootaxa* have been approximately 24%, closer to 20% for snake descriptions from the Americas and to 30% for species occurring outside the Americas. Of the 178 species description papers published in *Zootaxa* between 2001–2020,

19 (10.7%) were Open Access publications. *Zootaxa* and other outlets have also made numerous and important contributions to other aspects of snake systematics, such as phylogenetics and supraspecific taxonomy, but these are less easy to summarise quantitatively in this brief report.

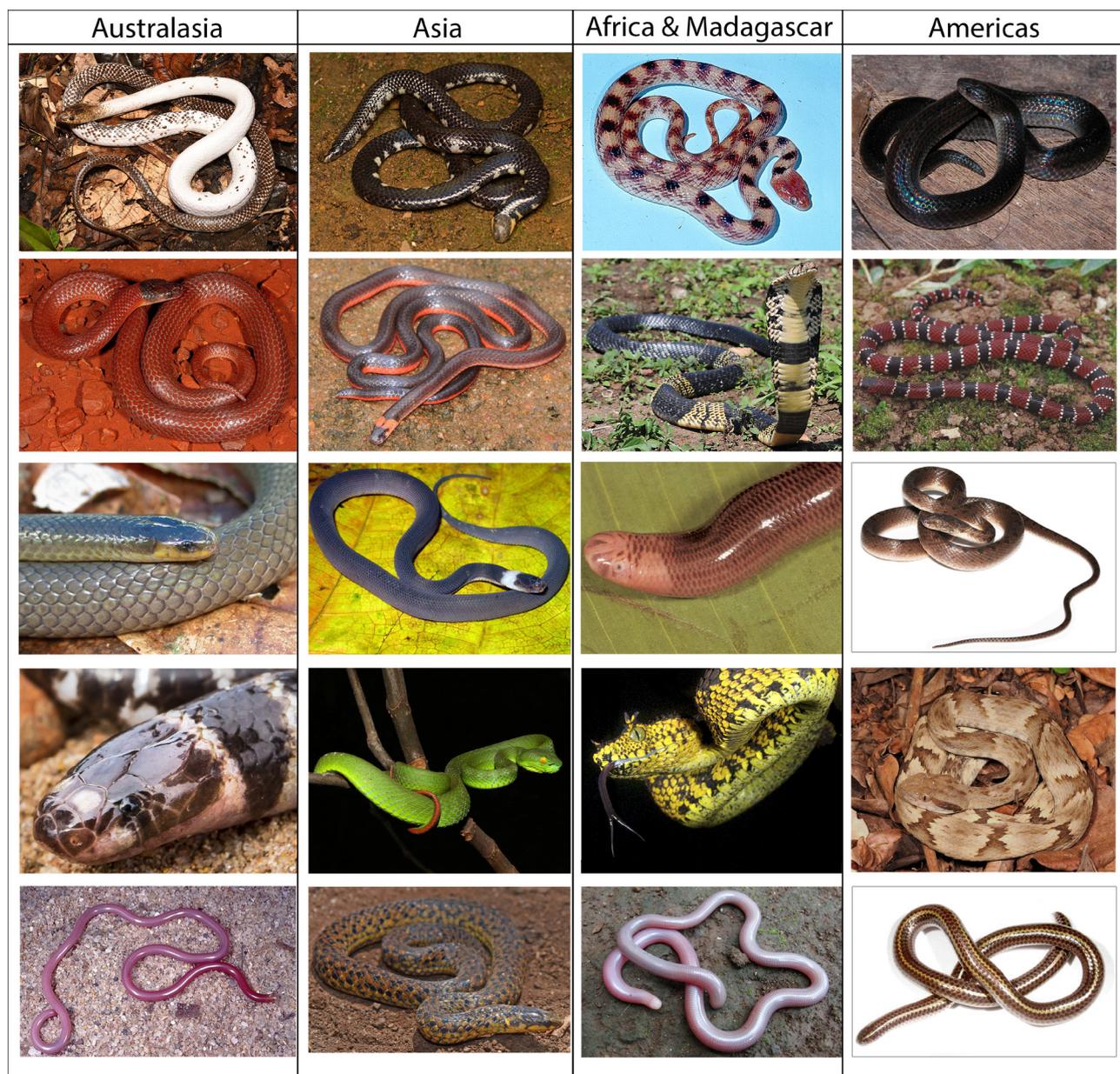


FIGURE 5. Examples of snake species described in *Zootaxa* arranged by region. Species in each column, from top to bottom; **Australasia:** 1. *Stegonotus aplini* (S. J. Richards), 2. *Suta gaikhorstorum* (B. Maryan), 3. *Toxicocalamus mattisoni* (F. Kraus), 4. *Vermicella parscauda* (F.J. Vonk), 5. *Anilius obtusifrons* (B. Maryan); **Asia:** 1. *Rhinophis melanoleucus* (S. Narayanan), 2. *Calliophis castoe* (H. Ogale), 3. *Parafimbrios lao* (A. Teynié), 4. *Trimeresurus caudornatus* (L. Ding), 5. *Xylophis mosaicus* (S. Das); **Africa & Madagascar:** 1. *Telescopus finkeldeyi* (W.D. Haacke), 2. *Naja savannula* (J.-F. Trape), 3. *Madatyphlops andasibensis* (V. Wallach/ F. Glaw), 4. *Atheris matildae* (M. Menegon), 5. *Letheobia mbeerensis* (P.K. Malonza); **Americas:** 1. *Atractus caete* (G. Skuk), 2. *Micrurus tikuna* (S. Haad), 3. *Leptodeira misinawui* (E. Celi Piedra), 4. *Bothrops sazimai* (R. Zorzal), 5. *Tetracheilostoma breuili* (S.B. Hedges).

When the journal *Zootaxa* was established in 2001, Mark Wilkinson was the sole Section Editor (SE) for Herpetology before handing over to Salvador Carranza from 2004. From 2006 to 2007 and from 2007 to 2010 Patrick David and David Gower, respectively, served as sole SE for all snakes. Since 2010, this section was subdivided into “New World” (the Americas) and “Old World” (non-Americas) snakes because of a rapidly increasing rate of

submissions. Diego Cisneros-Heredia was the SE for “New World” snakes 2010–2012, a section currently served by Hussam Zaher (since 2012) and Paulo Passos (since 2013). SEs for snakes from outside the Americas since 2010 have been David Gower (2010–2012), Zoltán T. Nagy (2012–2017), Truong Nguyen (2017–2020), and V. Deepak (Asian and Australasian snakes: 2020–present). Since 2019, Karin Tamar, Jirí Šmíd and Salvador Carranza have been SEs for other reptiles, including handling some snake manuscripts.

We used R platform (R Core Development Team, 2020) to plot the data and maps. The following packages in R were used for plotting: dplyr (Wickham *et al.* 2021), forcats (Wickham 2020), ggplot2 (Wickham 2016) rworldmap (Andy 2011), tidyverse (Wickham 2019) and Viridis (Garnier 2018). We thank Zootaxa’s Chief Editor and Founder, Zhi-Qiang Zhang, for support over the years, and for comments on an earlier draft of this article.

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