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https://doi.org/10.1590/SciELOPreprints.1164

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Submitted on (YYYY-MM-DD): 2020-08-30
Posted on (YYYY-MM-DD): 2021-02-11
Are publications on zoological taxonomy under attack?

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Abstract

Taxonomy is essential to biological sciences and the priority field to be supported in face of the biodiversity crisis. The industry of scientific publications has made extensive use of bibliometric indexes, resulting in distortions to institutions, organizations, and researchers, such as the side effect known as Journal Impact Factor (JIF) mania. Inadequacies of the most widely used bibliometric indexes from giant companies Clarivate™ (InCites™) and RELX™ Elsevier B.V. (Scopus®) to assessment of the relevance of taxonomic publications were considered as one of the impediments for the progress of this field. Recently, Clarivate suppressed the mega-journal Zootaxa, focused on taxonomy, from Journal Citation Reports (JCR), a database with 12,000 periodicals. Zootaxa suppression, together with other 32 journals, was based on an unusual high proportion of self-citations. Suppressed journals would thus not receive a value of JIF for 2020. A prompt reaction from the scientific community against the suppression of Zootaxa took place and, accordingly, Clarivate announced its reinstatement. This situation exposed many persistent myths and misuses of bibliometric indexes. The goal of this study is to shed light on the impacts of bibliometric indexes to the taxonomic field and on underlying aspects of the suppression of Zootaxa. Our major question is whether the suppression of any journal from JIF can really affect the production in the taxonomic field. We explored data metrics from the JCR (Web of Science Core Collection™) for 2010–2018 of the top ten zoological journals (eight are included in JCR) in the number of new taxa and journals focused on or regularly publishing taxonomic studies, totaling 123 journals. Zootaxa shows higher levels of self-citations than similar journals. We consider that two possible explanations provided for the high number of self-citations, i.e., Zootaxa’s scope on taxonomy and the fact that it is a mega-journal, are inadequate. Instead, putative explanations are related to the “Zootaxa phenomenon,” a sociological bias that includes visibility,
and potential harmful myths that portray *Zootaxa* as the unique journal that publishes taxonomic studies with an inviting JIF value. Menaces to taxonomy as a science come from many sources and the low bibliometric values of its journals are only one of the factors that contribute for establishing the so-called taxonomic impediment. We suggest rejection of bibliometric indexes, including JIF, instead of considering them when convenient. Taxonomists as a community, instead of being deeply focused on journal metrics endorsing the villainy of bibliometric policies imposed by dominant companies, should be engaged with renewed strength in actions directly connected to the development and promotion of this science.

**Keywords** Bibliometrics, Biodiversity Crisis, Journal Impact Factor (JIF), Scientometrics, Systematics.

**Introduction**

Every middle of year giant companies on scientific data analytics, the American-British Clarivate™ (InCites™) and the Dutch RELX™ Elsevier B.V. (Scopus®), release their metrics for scientific journals indexed in their huge databases, among them the Journal Impact Factor™ (JIF) and the CiteScore™, respectively. These metrics have been adopted as major qualifiers by several countries as a single measure of the quality of the produced research in their universities and institutes. Generally, funding for research in these institutions is derived from the taxes paid by the citizens of a given country. This policy produces a sort of quest or JIF mania for publishing in higher-ranked journals (Ioannidis & Thombs 2019). Therefore, depending on the impact factor, a researcher has better chances of evolving in his/her career, earn prestige, win grants, etc. Thus, these metrics have a strong impact on how and what scientific investigation can currently be conducted.

On the last day of June of this year, an interruption of the colossal concerns about the Covid-19 pandemic affected taxonomists around the world. An issue break through the media due to the involvement of zoologists from many countries: the suppression of the mega-journal *Zootaxa*, a periodical focused on zoological taxonomy, from the Journal Citation Reports™ (JCR) Science Edition metrics by Clarivate. Based on a high proportion of self-citations, along with other 32 journals from the 12,000 in JCR database, *Zootaxa* would not receive a value of Journal Impact Factor (JIF) for 2019; however, it would keep the values for previous years and still be indexed on the Clarivate Analytics platform.

By this time, with the publication of JIF 2019 by JCR, which called the attention of editors and authors who were eager to see how journals were ranked, passionate discussions arose because of *Zootaxa*’s suppression. A prompt reaction, hardly seen before, through many letters of support to *Zootaxa* and petitions from several societies and researchers, forced Clarivate to review its decision. We believe that suppression of *Zootaxa* entails so many unique elements that it needs a closer inspection. Some supporting letters could actually be considered political manifestos and others were very naïve, not to say alarmist or simply inaccurate in interpreting the fact as a new attack to taxonomy as a science. Among the utterly passionate arguments was the one that *Zootaxa* is the single vehicle to publish taxonomic papers.
nowadays, a statement obviously far away from the truth. At the end of July, in a short statement on
Twitter, Clarivate announced that *Zootaxa* and the *International Journal of Systematic and Evolutionary Microbiology* would be reconsidered in the regular refresh of the JCR to be published in September. Cases of suppression are common and not unique to the Clarivate platform, being most of them due to accusations of artificial boost or inflation of impact factors (e.g., Cortegiani et al. 2020). A particular case, almost a decade ago, had a wide repercussion among researchers when four journals edited in Brazil were suppressed under accusation of a citation-stacking scheme, a sort of cartel in which self-citations are exchanged among a group of journals (Van Norden 2013). Noticeably, cases of suppression in the past hardly received any sympathy from the scientific community, except from people directly involved as editors, perhaps as a signal that sectors of the academic community agreed with the suppression and considered that the affected journals deserved such “punishment.” Once discarded from JIF, a journal is excluded from the gold rush of academia targeting high-impact outlets.

In a system full of anachronisms, in which traditional journals supported by museums or scientific societies are struggling to survive and the scientific publishing industry is led by giant publishers such as John Wiley & Sons, Elsevier, and Springer Nature, among others with profit margins comparable to those of major players in drug, bank, and auto companies (Larivière et al. 2015), it is at least curious to perceive the commotion around the suppression of *Zootaxa*. We became intrigued and thus decided to provide some reflections aiming to shed light on underlying aspects of this issue. We believe that many of the arguments that were given in the supporting letters are based on misunderstandings about these metrics or are biased by personal interests due to the pressure to publish in high-impact journals. In addition, some points are also potentially misplaced. Bibliometric data are plagued by myths and misunderstandings (Glänzel 2008).

Our goal is to discuss the following questions. Can the suppression of any journal from JIF really affect the production in the taxonomic field? What are the consequences of *Zootaxa* suppression to taxonomy as a science? What means self-citation? What is the average JIF for taxonomic journals? Is *Zootaxa* a victim of its success? So, what is actually going on? To properly address these aspects, we first need to clarify a few concepts and dig further into the current situation of taxonomic journals, impact measures of scientific publications, and the role of individuals and mega-corporations in this arena.

**Material and methods**

We explored citation data including JIF, most-cited journals, and self-citation metrics from the Journal Citation Reports (Web of Science Core Collection™) of the last nine years (2010–2018) of the top ten zoological journals (TTJ, eight are included in JCR) when the number of new available names (based on the last five years of ION/Zoological Records™–ZR) is considered. We also checked up for journals focused on or regularly publishing taxonomic papers included in the Zoology and Entomology categories. Data from *Zootaxa* were retrieved from JCR 2018 because this journal was suppressed from the current edition and will only reappear in September. Journals included in both Zoology and Entomology categories were
considered simply as Zoology. Among 168 journals in Zoology and 101 in Entomology, 73 and 48 (both numbers include “plus” Zootaxa) were selected. Data of a total of 123 journals were compiled. In order to analyze the selected journals with available data from 2010–2018, a descriptive statistics approach including arithmetic mean of the bibliometric variables, their standard deviations, and the ratio between JIF without self-citations and JIF was used to investigate the influence of self-citations on JIF. This approach was conducted among the top ten journals (TTJ) in ZR and those in Zoology and Entomology categories. The percentage of self-citations and the ratio between JIF without self-citations and JIF per year of the journals between quartiles 2 and 3 (Q2 and Q3) in their categories plus TTJ were analyzed with non-parametric one-way analysis of variance Kruskal–Wallis H test (Dalgaard 2008) in R software (R Core Team 2018). Thus, journals with similar scope and JIF to Zootaxa were considered. In practice, all journals publishing taxonomic papers with JIF 2019 ranging from 0.25–2.315 in the categories Zoology and Entomology were included. This last criterion can be considered arbitrary because the proportion of taxonomic papers is dissimilar among the journals. Clearly, Zootaxa and ZooKeys, for example, have a greater amount of taxonomic papers, even when the fact that these journals accept studies on different subjects of biological sciences is considered. However, for the purposes of our discussion it is reasonable to consider such journals as similar in scope. The comparison is not easy because the original scope of Zootaxa is unique, due to its intent of “rapid publication of high-quality papers on any aspect of systematic zoology” and its focus on long papers. However, Zootaxa publishes today virtually any subject associated to zoological taxonomy/systematics, including biographies and points of view on theoretical subjects. Therefore, it is fair to conclude that all kinds of zoological papers are published in that journal, except those essentially dealing with ecological or experimental issues. The list of the journals and selected metrics are available in Table 1 and Supplementary File 1. Note that the categorization of journals follows Web of Science’s rules, so that many taxonomic journals that publish studies in the areas of zoology or entomology have not been included because they are listed in any other of 178 categories in the Science Edition database.

Results

A small fraction of the 123 taxonomic journals investigated adopt mandatory APC-GOA models (18.7%). DOA represents 22.0%, while the largest amount (59.3%) of journals are based on hybrid models with paywall to access their content, usually through readers’ payment/subscription (Table 1). A few journals, published in distinct platforms maintained by societies, require page charges to authors, irrespective of them being associated or not to the society, and they also have their contents protected by paywall; thus, these journals have both authors’ and readers’ charges (e.g., Journal of the Kansas Entomological Society and Malacologia).

The average levels of self-citations in the period of 2010–2018 range from 0.0–24.2% in Zoology, 0.0–34.9% in Entomology, and 4.6–34.9 in TTJ. For the last five years (2014–2018), these levels are 0.0–27.3% in Zoology, 0.0–36.4% in Entomology, and 4.5–36.4% in TTJ. The upper bounds of self-citation in the
Entomology and TTJ categories are due to *Systematic and Applied Acarology*; excluding this journal, the maximum level of self-citation for Entomology is 21.4% (*Coleopterists Bulletin*) for 2010–2018 and 27.3% (*Odonatologica*) for 2014–2018, while for TTJ they are 26.3% and 27.5% (both correspond to *Cretaceous Research*). In comparison to all other journals, excluding *Systematic and Applied Acarology*, the mean levels of self-citation are higher for *Zootaxa* than for any other journal in Zoology (Figure 1), Entomology (Figure 2), and TTJ categories (Figure 3), being 34.9% for 2010–2018 and 37.6% for 2014–2018 in *Zootaxa*. The levels of self-citation have gradually increased in *Zootaxa* from 27.99% in 2010 to 52.7% in 2018 (Figure 4). The percentage of self-citations for 2010–2018 is higher in *Zootaxa* and similar only to *Systematic and Applied Acarology* (Figure 4). The non-parametric one-way analysis of variance Kruskal-Wallis of Q2 and Q3 journals, plus TTJ, is highly significant for both the ratio of JIF without self-citation and JIF (JIF ratio: \(H = 326.8, \text{d.f.} = 67, P < 0.001\)), as well as to the proportion of self-citation (level of self-citation: \(H = 311.4, \text{d.f.} = 67, P < 0.001\)).

Influence of self-citations on JIF is almost insignificant to boost this metric because most journals from the three categories (Entomology, Zoology, and TTJ) have similar means of the ratio between JIF without self-citations and JIF for 2010–2018 (Figure 5), except *Shilap-Revista de Lepidopterologia*, a journal devoted to butterflies and moths, *Insects*, published by Multidisciplinary Digital Publishing Institute (MDPI)—a company with questionable conduct (Retraction Watch 2018) and considered predatory (Brezgov 2014)—, and *Zootaxa*. Some journals have large intervals based on SD in the influence of self-citation on JIF, while journals such as *Zootaxa* have a more constant influence of self-citation. For instance, in *Zootaxa* this ratio ranges from 0.55 to 0.60 and JIF reduces 39.6–45.6% when self-citations are excluded (Figure 6, Supplementary File 1).

*Zootaxa*, with around 15,000 citations, received 311% more citations than the second most cited journal, *ZooKeys*, during 2010–2018 (Figure 7, Supplementary File 1). Levels of self-citation are unrelated to number of citations. In Figure 7 it is shown the number of citations and journals with similar effects in the assessed metrics.

**Discussion**

**What are journal-level metrics?**

As non-bibliometric researchers, we suppose that measures in bibliometric science were created with some genuine purposes, which entail goals other than supposedly assessing the quality of research or researchers. Originally these indexes aimed to be objective tools for helping librarians in the development of journal collections (Haustein & Larivière 2015). According to Keith Collier (Senior Vice President of Product, Science Group Clarivate, [https://bit.ly/31gOMg3](https://bit.ly/31gOMg3)), the JIF mission is “to provide a thorough, publisher-neutral, multifaceted view of journal performance, reflecting the world’s highest-quality scientific and scholarly literature.” The hope relies on the citation frequency that would reflect a journal value and the use made of it and shows the average citations per published paper in a given journal (Garfield 1972).
Apart from the controversies of whether JIF actually assesses a journal “quality,” it aims, together with other bibliometric indexes, the recognition of patterns and trends in publications. Since its creation in the beginning of the 1970 decade (Garfield 1972, however, mentioned that it was designed in 1955; see also Garfield 2006), the metric became strongly popular and has been adopted as a major parameter for evaluating the quality of research, a topic certainly controversial (Hecht et al. 1998, Alberts 2013). The index is a very simple measure calculated from the ratio between the number of citations along a year (numerator) and number of papers published along the two previous years (denominator) — i.e., JIF 2019 is the number of citations in 2019 from papers published in 2017 and 2018 divided by the number of published papers in 2017 and 2018 — (Garfield 2006). So, in a certain way, it shows how trendy papers or subjects published by a journal are, as well as if they are achieving a wide audience. The bad twist occurred when organizations, including governmental funding agencies, reached the conclusion that, since journals are evaluated by their impact, bingo, the scientific production in universities, institutes, and graduate courses, as well as the researchers themselves, should be evaluated in the same manner. However, there is a flawed logic in extrapolating indexes such as JIF to evaluate work and careers. Hence, the JIF is recognized without doubt as being the most widely misused and abused bibliometric index in academic science (Hecht et al. 1998, Haustein & Larivière 2015, Ioannidis & Thombs 2019).

The adoption of scientific bibliometric indexes such as JIF has grown, especially in the last two decades, as a way to objectively evaluate the strongly competitive field of academic careers. However, there are many studies showing perverse pitfalls, for both researchers and organizations, of this use and interpretation of JIF (e.g., Hecht et al. 1998, Alberts 2013, Chapman et al. 2019). The quest and struggle for publishing in high impact journals produced the JIF mania (Ioannidis & Thombs 2019).

Although the use of JIF is not recommended for ranking individuals (Alberts 2013), its impact in the real-life academic career is crystal clear. It is widely perceived that an academic researcher can only evolve in his/her career by means of publishing in journals with high JIF values. The metric has well-known limitations when used to evaluate both journals or individual papers, because the index is strongly sensible to what is considered a citable item (The PLoS Medicine Editors 2006); also, it is characterized by a misuse of statistics such as media and median (Vanclay 2012) and may be radically influenced by a single or few papers (e.g., Dimitrov 2010). Its widespread adoption leads to several distortions such as unjustified multi-authored papers and schemes by journals to artificially increase JIF or impact inflation; these schemes are among the most common outcomes of the JIF mania. Because of the metrics inflation, the bibliometric platforms act as judges to prevent these types of distortion, excluding or punishing “deviant” journals. Indexing platforms such as Clarivate/JCR, for instance, adopt no less than 24 criteria into a putatively unreproducible method of analysis. When a journal disagrees or does not fulfill one of these criteria, it is suppressed (Clarivate 2020a). The lack of transparency greatly affects our ability to properly evaluate journal suppressions. The philosophical dilemma “Who watches the watchmen?”, eternalized in the famous graphic novel Watchmen, written by Alan Moore, fits well here.
Undeniably, exploring biodiversity is a core issue for the entire biological sciences (and humanity). In this context, taxonomic research is an essential priority in face of the current biodiversity crisis (Wheeler et al. 2012). The concept of taxonomy in biological sciences has a wide range of meanings, varying from the reductionist, atomized, and merely descriptive harmful view known as alpha taxonomy (e.g., Mayr 1969) — largely denoted as a minor science, old fashioned and intellectually poor — to a wide sense of taxonomy as the biggest among all biological sciences (e.g., Wheeler 2008), equivalent to the whole field of comparative biology. This wider view, which is adopted here, embraces from primary data acquisition in field expeditions to morphological, genomic, and even ecosystem analyses. Thus, it considers taxonomy as a relevant hypothesis-driven science. However, ordinary taxonomic research executed day-by-day is a generally low-cost activity that employs few technological tools. It is focused on the study of natural history collections with the goal of characterizing and making available basic data on biological entities. This work often involves the study of the morphology of poorly known taxa, an unknown sex of a given species or developmental stages, as well as undescribed taxa. Taxonomists must frequently work with poorly known subjects, looking for the novelty, odd, and thus dealing with unpopular or even neglected topics. Therefore, there are many cases of fine, well-written and beautifully fully illustrated comprehensive taxonomic monographs on animal groups that will probably rarely be cited. The small number of citations might even be related to the fact that such monographs successfully solve most of the basic taxonomic questions affecting one taxon. One colorful example was mentioned during the Brazilian Congress of Zoology in 2014. A colleague entomologist raised a simple question: “I am studying one of the smallest orders of insects (Zoraptera, the angel insects) with no more than four dozens of extant species, so what is the chance of citation, within only two years, of a paper that provides a great contribution on this group, including the description of new species?” Problems with the low rate of citations in taxonomy are widely discussed and the inadequacy of JIF for basic sciences is often mentioned (e.g., Krell 2000, Rafael et al. 2009). This is a paradox caused by the fact that taxonomy must, in part, necessarily deal with basic descriptive subjects, the new and unexpected, focusing on small parts of the tree of life.

Taxonomy is known as a science in crisis affected by losses of positions in institutions and reduction of funding resources. In addition to this scenario of gradual loss of workforce and grants, the discipline is also damaged by the biases or inadequacies of these so-called indexes of “quality” (see Ebach et al. 2011). Some solutions for low citations suggested the mandatory citation of references in which authorities erected new taxa (original descriptions) whenever a name was mentioned in a study, a rule endorsed by Zootaxa but not strictly enforced by the journal. This rule would partially explain its high level of self-citations. However, this strategy is deeply misleading, because original descriptions, especially the old ones, are often not adequate for species characterization and recognition. A more straightforward approach would be to make clear which concept of species is being adopted and provide the bibliographic source
Another important point is that multidisciplinarity in biological sciences has blurred the limits among traditional disciplines, even the descriptive ones. All these aspects were suggested as reasonable explanations for the high levels of Zootaxa self-citations. However, they are not valid because there are many other journals currently accepting taxonomic studies, being either purely descriptive or including broader analytical approaches; these journals are obviously attractive in the context of the JIF mania game (Supplementary File 1).

**Zootaxa phenomenon and suppression quarrel**

As authors of papers on distinct zoological taxa, editors of special issues, and reviewers of manuscripts submitted to Zootaxa along the last ten years, we feel comfortable to offer an opinion on the journal and its impact in the taxonomic world, an actual phenomenon that transformed it into the leading vehicle for making new zoological names available.

Since its establishment, Zootaxa has become a prestigious forum for promotion and discussion of all topics of taxonomic science and thus reached a distinguished position among other similar journals. Unquestionably, the birth of the journal was a milestone to the field of zoological taxonomy. Started in 2001 with a hybrid platform of publication (i.e., the payment of Article Processing Charges – APC by authors is optional for making the paper Open Access – OA), when 300 pages were published, the journal increased to 32,330 pages in 2010 (Zhang 2011) and ended 2019 with the impressive record of 47,528 pages; the latter comprising 2,400 papers in 176 volumes (data compiled from Zootaxa’s site). In its first decade, Zootaxa has made available about 20–25% of the new nomina per year (Zhang 2014). In the last five years, it has become the main journal, truly the leader in the field of descriptive taxonomy, with 24,722 (26.57% of the total) newly erected taxa made available (ION/Zoological Records™ 2020). Despite its few years of existence, the journal has received remarkable status and visibility. Papers published in it have potentially higher chances of being cited by fellow taxonomists, unlike the situation in many other similar journals in the field that clearly have a lower visibility. Zootaxa has been the first choice for a legion of young taxonomists for their very first papers. The relatively high JIF of the journal is certainly among the reasons for this choice. Furthermore, for those zoologists who are not primarily taxonomists but who eventually decide to publish a taxonomic paper, the journal is also probably the first choice, if not the single one known. Indeed, Zootaxa is so influential nowadays that a somewhat pejorative term, “Zootaxa author,” has been coined, meaning those researchers who only publish in the journal or have a massive amount of their papers in it, reaching 80% or more. Why this phenomenon? Why does a journal congregate such a huge parcel of publications in a field? Is this situation actually good for taxonomy?

For almost a decade Zootaxa was the single big (or mega) journal in the field designed to attend taxonomic science, even though several smaller journals also published most of their issues with a high amount of taxonomic papers. Today Zootaxa has competitors with the advantage of having either Gold Open Access (GOA) or Diamond Open Access (DOA) policies, such as the European Journal of Taxonomy.
(first issue published in 2011) and ZooKeys (first issue in 2008). However, in the case of ZooKeys, a minimum APC of €700 is required for mandatory open access; this is a huge obstacle, especially for researchers from developing countries, outside the group of those countries considered of lowest income, who do not automatically qualify for a fee waiver. The Zootaxa initiative from Magnolia Press Ltd. was so successful that it stimulated the creation of some new journals, including Phytotaxa, its sibling version dedicated to plant sciences. Data on Magnolia Press, which is based in New Zealand, is not easy to obtain. In the company’s website (magnoliapress.com) not much information is given, for instance, which is the registered business model (for-profit or not-for-profit).

The great significance of Zootaxa cannot be denied and it has become the most important vehicle for the publication of taxonomic studies. However, it is obviously not the single journal devoted to taxonomic science, such as depicted by some of the supporting letters. So, why has the suppression caused that enormous commotion? A quick answer is because in some megadiverse countries, such as Brazil in which most of the fauna remains undescribed, the higher education and scientific organizations evaluation systems have entirely embraced bibliometric indexes (e.g., Curry 2018, Krüger 2020, Reategui et al. 2020). Therefore, these metrics play an important role in the system and, for instance, a Brazil-based author’s choice of a scientific journal is largely based on values such as JIF. Consequently, the suppression of Zootaxa was received as a serious setback for taxonomists in such countries, especially so of course for those who publish most or even all their papers in the journal. This last aspect has a clear influence on the high rate of self-citations, as well as on the JIF of Zootaxa (Figures 1–3, 5), even considering that Clarivate recognized that 20% of papers on zoology were published by the journal.

What is self-citation and its consequences?

An important distinction should be made between two categories of self-citation, individual (author) and collective (journal) self-citation, although both potentially result in a boost of bibliometric indexes. There are many legitimate reasons for a researcher to cite his/her earlier works; in many cases, self-citations are unavoidable, depending on the circumstances or subject (Glänzel 2008). For example, an author could have been the single authority on a taxon during the last thirty years or present a high production in a specialized field. In these situations, self-citation alone is not necessarily fraudulent. Concerns arise when similar citations are not received in the work of other researchers in the field (Haustein & Larivière 2015) or, more commonly, based on the myth that self-citations help to artificially increase one’s own position in the community (Glänzel 2008). Differently, collective (journal) self-citation would be more problematic and is most probably a side-effect of the JIF mania, caused by the competition among journals for higher journal ranking, prestige, and higher monetary earnings through higher subscription pricing, which is often connected to journal-level bibliometrics. Dear readers do not be naïve: academic publications are million dollars businesses, truly having high profit margins (Monbiot 2011, Larivière et al. 2015). It is thus not surprising that journals engage in “impact factor wars” to manipulate their metrics using strategies such as
citation stacking, enlargement of cited references during the review process to include papers from the own journal (sometimes even coercive self-citation), and rejection of studies with low potential of citation (Haustein & Larivière 2015). Thus, a high level of self-citations in a journal is not easy to understand and should be checked with caution.

Self-citation phenomena, either of author or journal types, have been deeply investigated from various perspectives, including sociological and bibliometric aspects. A review focused on author self-citation and all its technical nuances was presented by Szomszor et al. (2020). Generally, high levels of self-citation are condemned, particularly when journal self-citation is interpreted as the result of manipulation for boosting indexes; in these situations, it has of course been determined that the biased metrics should not be considered for analyses of influence or impact (Ioannidis & Thombs 2019). However, self-citation can be legitimate in certain circumstances (Chorus & Waltman 2016). Consequently, levels of self-citation are not easy to analyze. Ioannidis & Thombs (2019) argued that these levels naturally vary, and high levels may be justifiable in highly specialized journals or in disciplines with few available journals.

Zootaxa hardly meets the aforementioned criteria for reasonable justification of high self-citations. Also, self-citation has increased in the journal over the years (Figure 4). Zootaxa is clearly not highly specialized. A quick examination of its issues will confirm this point and taxonomy as a whole is far from having only a few other available journals, at least to most groups. We compiled 123 journals that publish taxonomic papers, solely in the JCR database (Table 1). Therefore, there are clearly many options since these journals surely publish a great deal of descriptive taxonomy (Figures 1–2). If specialization were true for Zootaxa, we would expect that more specialized journals devoted to small groups, such as Odonatologica (dragonflies) and Acarologia (mites), which together represent a small part of extant diversity, would present similar or even higher self-citation levels, which is not the case (Figures 1–2, 5). On the other hand, we would also expect that journals specialized in megadiverse groups, such as beetles, bees, moths, butterflies, etc., would likewise have high levels of self-citation, which again is not the case (Figures 2, 5). Even journals dealing with taxa from a specific region of the world, such as Neotropical Ichthyology or South American Journal of Herpetology, also present significantly lower levels of self-citation. Therefore, the scope of Zootaxa, with its focus on taxonomy, does not explain the high level of self-citations. Instead, an explanation should be looked for in the elements of the Zootaxa phenomenon depicted above. A relevant aspect to be observed in this discussion is that the great majority of the citations given to the analyzed journals came from Zootaxa (Figures 1–3).

In addition, Chorus & Waltman (2016) carefully studied journal self-citation and proposed a measure to evaluate boosts in the JIF, detecting disproportional and potentially unethical behavior (“Impact Factor Biased Self-Citation Practices”). They did not consider their measure unfailing and discussed a few cases when self-citation would be legitimated. The latter include distinct situations. For instance, a researcher could be inspired by recent studies published in a journal and thus decides to conduct similar research; accordingly, that journal would naturally be an important source and his/her first
choice for publication. Also, there are situations when, after finishing a manuscript, an author realizes that most of the cited references are from a given journal; the latter becomes again a naturally expected option. We believe that such cases are strongly associated to the Zootaxa mega-journal phenomenon and appear to partially explain its high levels of self-citation.

We are confident that a journal can publish high-quality, robust science regardless of its level of self-citation. There is not necessarily any relationship between the rate of journal-level self-citation and the quality of the research published in a journal, particularly in the case of high output journals such as Zootaxa. Clarivate appears to want to promote a sense of competition among journals, so that it can sell its journal ranking data and analytics—clearly, zoological taxonomists and their publishing and citing behaviors do not fit the model that Clarivate seemingly wants to promote. Who is wrong here? The community of scientists producing taxonomic science for which they were specifically trained to, or the profit-driven analytics company that appears to know nothing about taxonomy and yet still wants to rank and supposedly provide sound judgement on the quality of taxonomic journals? We think of course that the scientific community knows best, whereas Clarivate appears to know or care very little about robust science.

Is the suppression a new attack on taxonomy?

Based on the Zootaxa suppression and the academic engagement into a bandwagon sympathetic commotion, opinions in social media, and letters from societies and researchers (e.g., SBH 2020, SOL 2020, Van Damme 2020), mainly from megadiverse countries, which appear to be in favor of the journal and ask Clarivate to review its decision, two main conclusions could be unearthed: (1) JIF is very important to taxonomy and (2) taxonomy is under attack. We seriously doubt both conclusions and invite the reader to carefully consider these aspects.

Why do researchers choose to publish in Zootaxa? Several reasons influence the preference of a researcher for a specific journal. Certainly, scope, visibility, prestige in the field, and JIF are among the most influential criteria. It is realistic to assume that most of the authors of Zootaxa are looking for a journal that has fast reviewing and production processes, is free of charge to authors (no APC), has a comparatively high JIF, and has no limit of pages for a manuscript. Authors and readers of the journal seem not to be concerned about the hybrid policy of paywall for accessing most of the published issues, with few published articles having GOA through payment by authors (APC-OA). Among the reasons for this complaisance are the article-processing charges for most open access journals with values of hundreds of Euros or US Dollars, generally excessively expensive for researchers from developing countries, the possible economic situation of most contributors (e.g., Brazilian researchers are authors of most papers in the journal, https://bit.ly/2Y0hsQ9), and the open access is viable through platforms of self-archiving, such as ResearchGate, or websites, such as Sci-Hub; the latter illegally makes paywalled content available for free and is regarded as “piracy.” High APC costs are clearly impeditive for researchers from most countries and
for small research groups lacking big budgets. Also, there are certainly many other priorities for spending
limited research money. Nevertheless, open access through platforms such as Sci-Hub is deprived of
respect for the intellectual property or copyright laws and certainly raises many moral issues. Therefore, it
is at least controversial that authors are opposed to paying fees to APC-GOA journals and are in favor of
hybrid platforms because it is possible to break paywalls to access payment-based content.

The holy grail quest for Diamond open access (no APC for authors, DOA) versus paywall policies
creates a paradox: how can journals cover the costs involved in publishing, copyediting, DOI generation,
data insertion into biodiversity databases, file archiving, etc.? These controversies concerning OA were
depicted with vibrant colors during the gradual transition of big publishers’ journals, such as Diversity and
Distributions, from readers’ payment to authors’ payment in an APC-OA model (Peterson et al. 2019).
Gradually, the scientific scholarship publications are changing from paywall to GOA with authors paying the
charges (APC-GOA) for publication in biodiversity journals. Certainly, this is the best business model option
for the big publishers because it avoids losses generated by white (sometimes named black OA) or green
platforms such as Sci-Hub, ResearchGate, or Academia Inc. (site: academia.edu). Here it is important to
highlight that authors never received messages from *Zootaxa* demanding the removal of files from any such
platforms, quite unlike the crusade carried out by big publishers against these kinds of storage and access-
granting.

We are aware of the leading role that bibliometric indexes play in the science publishing industry,
as well as their considerable influence on how and where science is done nowadays. However, JIF cannot
determine the development of a whole scientific field, even when supporting agencies adopt it as a
criterion of quality. A high JIF does not necessarily come from a high-quality taxonomic study; it is probably
much more connected to the scope and diversity of methods and sources of data that are aligned to high
JIF ranked journals. Another aspect to be considered is that *Zootaxa* was focused initially on long papers on
descriptive taxonomy; subsequently, it gradually changed its scope and started accepting short notes and
studies on various subjects associated to zoological taxonomy/systematics. Curiously, soon after Clarivate
announced the reinstatement of the JIF of *Zootaxa* for next September (Clarivate 2020b), the journal’s
website refreshed its JIF, showing perhaps that it is willingly taking part in the JIF games.

**Conclusions**

Menaces to taxonomy as a science come from distinct sources and the low bibliometric values of its
journals is only one factor that contributes for establishing the so-called taxonomic impediment. Clarivate is
a for-profit company, but Magnolia Press Ltd. and other similar publishers are also not examples of
nonprofit NGOs. The reversion of the suppression of *Zootaxa* by Clarivate is irrelevant to biological sciences
and taxonomy because Journal Impact Factors are statistically illiterate (Curry 2012) and cause a great deal
of harm to science. This reinstatement should certainly not be regarded by taxonomists as a victory for the
field. As a community we should not endorse the villainy of bibliometric policies that bring more harm than benefit to our field.

We hope the community of taxonomists gets engaged with renewed strength in actions directly connected to the development and promotion of our science. Instead of being deeply focused on proprietary gaming, irreproducible journal metrics sold to our institutions and research funders, controlled by a USA/UK based company, itself acquired in 2016 by two private equity funds (Onex Corporation and Baring Private Equity Asia – ONEX/BPEA; see Cision Ltd./PR Newswire 2016, https://prn.to/31nGDYC, BPEA 2019, https://bit.ly/3hm9yC4) we should perhaps concentrate, for instance, on securing professional positions for young talented taxonomists, who are much needed for the proper development and maintenance of museums, scientific collections, and public digital databases. We are sure that Zootaxa has provided an invaluable service to the field of taxonomy. Suppression from JIF will not change or diminish this remarkable contribution.

We emphasize that menace to taxonomy comes not much from the suppression of any specific journal from a bibliometric platform belonging to a big company. Much more harm is caused by the limited renewal of professional positions and the loss of collections, such as the huge ones that were housed at the Museu Nacional of the Federal University of Rio de Janeiro. These are the real issues that should motivate the engagement and action of taxonomists around the world. In short and loud, taxonomy is produced by taxonomists, not by journals. We recognize the deep impact the JIF mania has on the careers of taxonomists, due to governmental policies that embraced bibliometric evaluations in a highly competitive environment, with researchers struggling for limited grants. However, our current challenges cannot be dealt with through endorsement of the status quo. We need to change the focus. Also, it is contradictory to argue in favor of the reinstatement of Zootaxa to the JIF without considering that this journal has this index influenced by the currently high levels of self-citation. Regardless of its real significance, JIF is considered one of the attractive qualities of Zootaxa. The bibliometrics game in science has its own rules. An honorable choice would be to reject bibliometric indexes altogether, including JIF, instead of considering them when convenient. We are seeing a bankruptcy of the system of scientific publications devoted to the knowledge on biodiversity, at least for researchers, and it would be much better if the system could be somehow reinvented with ways to support diamond open access (DOA) as its main goal.

Taxonomic groups that still need massive descriptive studies, with many species waiting to be discovered, such as Coleoptera, Hymenoptera, Lepidoptera, Diptera, and Arachnida, have many journals devoted specifically to them. The JIF of these journals is similar to that of Zootaxa and, of course, research on those taxa can also be published in more general outlets in Entomology or Zoology categories. Therefore, the high levels of self-citation in Zootaxa are hardly justifiable. It appears to us that these high levels are caused by a sociological bias, being a side effect of the Zootaxa phenomenon. Myths about Zootaxa as the unique journal that publishes taxonomic studies are clearly harmful to the field. In addition, an urgent question must be answered: if Zootaxa decides to ignore JIF altogether, would it remain a good
vehicle for the publication of taxonomic papers? If your answer is no, there is certainly a big problem with the community of practitioners in the taxonomic world.

Acknowledgements
André Adrian Padial (DBot – UFPR) helped a great deal with the statistical analysis.

Competing interests
The authors declare no competing interests and their organizations had no role in any steps of the study, from its design to submission for publication.

Funding
This study was partially supported by grants from National Council for Scientific and Technological (CNPq) through research productivity fellowships to GM (proc. 303229/2018-7), JAR (proc. 300019/2017-3), LF (proc. 308337/2019-0), and LM (proc. 308994/2018-3).

Author contributions
APP designed the study, compiled, organized, and analyzed the data, wrote the manuscript, revised, and approved its final version.
GM, LF, and RM wrote the manuscript, revised, and approved its final version.
LM and JR revised and approved the final version.

Data availability
Primary compiled data was arranged in Supplementary File 1.

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Figure legends

Figure 1. Amount of citations including all journals (blue), from most-citing journal (yellow), and self-citations (red) in the category Zoology from Journal Citation Reports (JCR) Science Edition database in Clarivate. * The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.

Figure 2. Amount of citations including all journals (green), from most-citing journal (yellow), and self-citations (red) in the category Entomology from Journal Citation Reports (JCR) Science Edition database of Clarivate. * The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.

Figure 3. Amount of citations including all journals (blue), from most-citing journal (yellow), and self-citations (red) for the top ten zoological journals (TTJ, eight are on JCR) when the number of new available names is considered. Journal Citation Reports (JCR) Science Edition database of Clarivate. * The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.

Figure 4. Evolution of percentage of journal-level self-citation in Zootaxa based on JCR/Clarivate 2019.

Figure 5. Mean percentage (dot) and standard deviation (line) of self-citations from 2010 to 2018 based on JCR/Clarivate 2019.

Figure 6. Mean of the ratio between JIF without self-citations and JIF (dot) and standard deviation (line) of journal impact factor (JIF) without self-citations from 2010 to 2018 based on JCR/Clarivate 2019.

Figure 7. Number of citations based on JCR/Clarivate 2019 and notations of observed effects on bibliometric measures compared to Zootaxa.

Tables, Figure captions and graphs

Table 1. Journals, and their publishing model, indexed in Journal Citation Reports (Web of Science Core Collection™) and that publish taxonomic studies included in the Zoology and Entomology categories plus the top ten zoological journals (TTJs) in number of new taxa in the last five years based on the Zoological Records. APC-GOA = gold open access through payment of article processing charges; DOA = diamond open access; GOA = gold open access; Hybrid = optional payment of gold open access, access to the content via subscription (paywall).

| Journal | Abbreviation used in JCR | Category | ISSN | Publisher | Publishing model |
|---------|--------------------------|----------|------|-----------|-----------------|
| Acarologia | ACAROLOGIA | Entomology | 0044-586X | Centre de Biologie pour la Gestion des Populations, France INPA/SciELO | DOA |
| Acta Amazonica | ACTA AMAZON | Zoology | 0044-5967 | Acta Chiropterologica, published by the Museum and Institute of Zoology at the Polish Academy of Sciences, is devoted solely to the study and discussion of bats. | DOA |
| Acta Chiropterologica | ACTA CHIROPTEROL | Zoology | 1508-1109 | Acta Chiropterologica, published by the Museum and Institute of Zoology at the Polish Academy of Sciences, is devoted solely to the study and discussion of bats. | DOA |
| Acta Entomologica Musei Nationalis Pragae | ACTA ENT MUS NAT PRA | Entomology | 1804–6487 | BioOne/ Museum and Institute of Zoology, Polish Academy of Sciences Hungarian Academy of Sciences | Hybrid/APC-GOA [?] |
| Acta Zoologica Academiae Scientiarum Hungaricae | ACTA ZOOL ACAD SCI H | Zoology | 1217-8837 | BioOne/Entomological Society of Southern Africa Pensoft Publishers | Hybrid/APC-GOA |
| African Entomology | AFR ENTOMOL | Entomology | 1021-3589 | BioOne/Entomological Society of Southern Africa Pensoft Publishers | Hybrid/APC-GOA |
| African Invertebrates | AFR INVERTEBR | Zoology | 1681-5556 | Taylor & Francis Group | Hybrid/APC-GOA |
| African Zoology | AFR ZOOL | Zoology | 1562-7020 | Taylor & Francis Group | Hybrid/APC-GOA |
| Journal Name                                    | Abbreviation | Subject       | Volume | Publisher                                      | Access Model |
|-----------------------------------------------|--------------|---------------|--------|-----------------------------------------------|--------------|
| American Malacological Bulletin               | AM MALACOL BULL | Zoology       | 0740-2783 | The Sheridan Press                             | Hybrid/APC-GOA |
| American Museum Novitates                     | AM MUS NOVIT  | Zoology       | 0003-0082 | BioOne/American Museum of Natural History     | Hybrid/APC-GOA |
| Amphibia-Reptilia                             | AMPHIBIA REPTILIA | Zoology | 0173-5373 | Brill Academic Publishers                     | Hybrid/APC-GOA |
| Annals of Carnegie Museum                     | ANN CARNEGIE MUS  | Zoology | 0097-4463 | BioOne/Carnegie Museum                        | Hybrid/APC-GOA |
| Annals of the Entomological Society of America| ANN ENTOMOL SOC AM | Entomology | 0013-8746 | Oxford University Press                       | Hybrid/APC-GOA |
| Annales de la Societe Entomologique de France | ANN SOC ENTOMOL FR | Entomology | 0037-9271 | Taylor & Francis Group                        | Hybrid/APC-GOA |
| Aquatic Insects                               | AQUAT INSECT  | Entomology    | 0165-0424 | Taylor & Francis Group                        | Hybrid/APC-GOA |
| Arthropod Systematics & Phylogeny             | ARTHROPOD SYST PHYLO | Entomology | 1863-7221 | Senckenberg                                    | DOA          |
| Arthropoda Selecta                            | ARTHROPODA SEL | Entomology    | 0136-006X | Naturhistorische, Germany                      | DOA          |
| Asiaen Herpetological Research                | ASIAN HERPETOL RES | Zoology | 2095-0357 | Chinese Academy of Sciences/Science Press     | Hybrid/APC-GOA |
| Asian Myrmecology                             | ASIAN MYRMECOL | Entomology    | 1985-1944 | International Network for the Study of Asian Ants | DOA          |
| Austral Entomology                            | AUSTRAL ENTOMOL | Entomology    | 2052-1758 | John Wiley & Sons                             | Hybrid/APC-GOA |
| Bulletin of Insectology                       | B INSECTOL   | Entomology    | 1721-8861 | Department of Agricultural and Food Sciences, Italy | DOA          |
| Belgian Journal of Zoology                    | BELG J ZOOL  | Zoology       | 0777-6276 | Royal Belgian Zoological Society and the Royal Belgian Institute of Natural Sciences | DOA          |
| Caldasia                                      | CALDASIA     | Zoology       | 0366-5232 | Universidad Nacional de Colombia/SciELO       | DOA          |
| Canadian Entomologist                         | CAN ENTOMOL  | Entomology    | 0008-347X | Cambridge University Press                    | Hybrid/APC-GOA |
| Canadian Journal of Zoology                   | CAN J ZOOL   | Zoology       | 0008-4301 | Canadian Science Publishing                  | Hybrid/APC-GOA |
| Coleopterists Bulletin                        | COLEOPTS BULL | Entomology    | 0010-065X | BioOne/The Coleopterists Society              | Hybrid/APC-GOA |
| Contributions to Zoology                      | CONTRIB ZOOL | Zoology       | 1383-4517 | Brill Academic Publishers                    | APC-GOA      |
| Copeia                                        | COPEIA       | Zoology       | 0045-8511 | BioOne/American Society of Ichthyologists and Herpetologists (ASIH) | APC-GOA      |
| Cretaceous Research                           | CRETAUCEOUS RES | Paleontolog | 0195-6671 | Elsevier B.V.                                 | Hybrid/APC-GOA |
| Current Herpetology                           | CURR HERPETOL | Zoology       | 1345-5834 | BioOne/The Herpetological Society of Japan    | Hybrid/APC-GOA |
| Cybium                                        | CYBIUM       | Zoology       | 0399-0974 | Société Française d'Icthyologie              | Hybrid/APC-GOA |
| Deutsche Entomologische Zeitschrift           | DEUT ENTOMOL Z | Entomology | 1435-1951 | Pensoft Publishers                           | APC-GOA      |
| Entomologica Americana                       | ENTOMOL AM NY | Entomology    | 1947-5136 | BioOne/The New York Entomological Society     | Hybrid/APC-GOA |
| Entomologica Fennica [merged with Annales Zoologici Fennici] | ENTOMOL FENNICA | Entomology | 0785-8760 | Finnish Zoological and Botanical Publishing Board | APC-GOA      |
| Entomological News                            | ENTOMOL NEWS | Entomology    | 0013-872X | BioOne/The American Entomological Society     | Hybrid/APC-GOA |
| Entomological Research                        | ENTOMOL RES  | Entomology    | 1738-2297 | John Wiley & Sons                             | Hybrid/APC-GOA |
| Entomological Science                         | ENTOMOL SCI  | Entomology    | 1343-8786 | John Wiley & Sons                             | Hybrid/APC-GOA |
| Journal Name                                      | Abbreviation | Subject Area | Volume | Year |
|--------------------------------------------------|--------------|--------------|--------|------|
| European Journal of Entomology                   | EUR J EN TOMOL | Entomology   | 1210-5759 |      |
| European Journal of Taxonomy                     | EUR J TAXON   | Zoology      | 2118-9773 |      |
| Florida Entomologist                             | FLA EN TOMOL | Entomology   | 0015-4040 |      |
| Gayana                                           | GAYANA       | Zoology      | 0717-652X |      |
| Herpetological Journal                           | HERPETOL J    | Zoology      | 0268-0130 |      |
| Herpetological Monographs                        | HERPETOL MONOG | Zoology | 0733-1347 |      |
| Herpetologica                                    | HERPETOLOGICA | Zoology      | 0018-0831 |      |
| Hystrix-Italian Journal of Mammalogy            | HYSTRIX      | Zoology      | 0394-1914 |      |
| Ichthyological Research                          | ICHTHYOL RES | Zoology      | 1341-8998 |      |
| Ichthyological Research                          | ICHTHYOL EXPLOR FRES | Zoology | 0936-9902 |      |
| Insect Systematics & Evolution Insects           | INSECT SYST EVOL | Entomology | 1399-560X |      |
| International Journal of Acarology              | INT J ACAROL | Entomology   | 0164-7954 |      |
| International Journal of Odonatology            | INT J ODONATOL | Entomology | 1388-7890 |      |
| International Journal of Primatology            | INT J PRIMATOL | Zoology | 0164-0291 |      |
| Invertebrate Systematics                         | IN VER TE BR SYST | Zoology | 1445-5226 |      |
| Journal of Arachnology                           | J ARACHNOL   | Entomology   | 0161-8202 |      |
| Journal of Asia-Pacific Entomology               | J ASIA PAC EN TOMOL | Entomology | 1226-8615 |      |
| Journal of Conchology                            | J CON CHOL   | Zoology      | 0022-0019 |      |
| Journal of Crustacean Biology                    | J CRUSTACEAN BIOL | Zoology | 0278-0372 |      |
| Journal of the Entomological Research Society    | J EN TOMOL RES SOC | Zoology | 1302-0250 |      |
| Journal of Helminthology                         | J HELMIN THOL | Zoology      | 0022-149X |      |
| Journal of Herpetology                           | J HERPETOL   | Zoology      | 0022-1511 |      |
| Journal of Hymenoptera Research                  | J HYMENOPT RES | Entomology | 0022-1511 |      |
| Journal of the Kansas Entomological Society      | J K AN S AS EN TOMOL SOC | Entomology | 0022-8567 |      |
| Journal of the Lepidopterists Society            | J L EPID SOC | Entomology   | 0024-0966 |      |
| Journal of Mammalogy                             | J MAMMAL     | Zoology      | 0022-2372 |      |
| Journal of Molluscan Studies                      | J MOLLUS STUD | Zoology | 0260-1230 |      |
| Journal of Natural History                       | J NAT HIST   | Zoology      | 0022-2933 |      |
| Journal of Nematology                            | J N EMATOL   | Zoology      | 0022-300X |      |
| Journal of Systematic Palaeontology              | J SYST PAL AE ON TOL | Paleontolog | 1477-2019 |      |
| Journal of Zoological Systematics and Evolutionary Research Malacology | J ZOOL SYST EVOL RES | Zoology | 0947-5745 | John Wiley & Sons | Hybrid/APC-GOA |
| --- | --- | --- | --- | --- | --- |
| Malacology | MALACOLOGIA | Zoology | 0076-2997 | BioOne/Institute of Malacology | Hybrid/APC-GOA |
| Mammalia | MAMMALIA | Zoology | 1864-1547 | Walter de Gruyter GmbH | Hybrid/APC-GOA |
| Molluscan Research | MOLLUSCAN RES | Zoology | 1323-5818 | Taylor & Francis Group | Hybrid/APC-GOA |
| Myrmecological News | MYRMECOL NEWS | Entomology | 1997-3500 | Austrian Society of Entomofaunistics | DOA |
| Nautilus | NAUTILUS | Zoology | 2358-2936 | BioOne/Brazilian Crustacean Society | DOA |
| Nematology | NEMATOLOGY | Zoology | 1388-5545 | Bailey-Matthews National Shell Museum | DOA [?]
| Neotropical Entomology | NEOTROP ENTOMOL | Entomology | 1519-566X | Springer Nature | Hybrid/APC-GOA |
| Neotropical Ichthyology | NEOTROP ICHTHYOL | Zoology | 1679-6225 | Sociedade Brasileira de Ictiologia/SciELO | APC-GOA |
| New Zealand Journal of Zoology | NEW ZEAL J ZOOL | Zoology | 0301-4223 | Taylor & Francis Group | Hybrid/APC-GOA |
| Nota Lepidopterologica | NOTA LEPIDOPTEROLOGI NZ ENTOMOL | Zoology | 0342-7536 | Pensoft Publishers | APC-GOA |
| New Zealand Entomologist | ODONATOLOGICA | Entomology | 0375-0183 | Osmylus Scientific Publishers/International Odonatological Foundation, Societas Internationalis Odonatologica (S.I.O.) | Hybrid/APC-GOA |
| Organisms Diversity & Evolution Oriental Insects | ORG DIVERS EVOL | Zoology | 1439-6092 | Springer Nature | Hybrid/APC-GOA |
| Proceedings of the Entomological Society of Washington Pacific Science | P ENTOMOL SOC WASH | Entomology | 0013-8797 | BioOne/Entomological Society of Washington | Hybrid/APC-GOA |
| Pacific Science | PAC SCI | Zoology | 0030-8870 | BioOne/University of Hawai‘i Press | Hybrid/APC-GOA |
| Paleontology | PALEONTOL J | Paleontolog y | 0022-3360 | Cambridge University Press | Hybrid/APC-GOA |
| Pan-Pacific Entomologist | PAN PAC ENTOMOL | Entomology | 0031-0603 | BioOne/Pacific Coast Entomological Society | Hybrid/APC-GOA |
| Phyllomedusa | PHYLLOMEDUSA | Zoology | 1519-1397 | Esalq/USP | OA |
| Primates | PRIMATES | Zoology | 0032-8332 | Springer Nature | Hybrid/APC-GOA |
| Records of the Australian Museum | REC AUST MUS | Zoology | 0067-1975 | Australian Museum | DOA [?]
| Revista Brasileira de Entomologia | REV BRAS ENTOMOL | Entomology | 0085-5626 | Sociedade Brasileira de Entomologia/SciELO | APC-GOA |
| Revista Colombiana de Entomologia | REV COLOMB ENTOMOL | Entomology | 0120-0488 | Colombian Society of Entomology | APC-GOA |
| Revista de la Sociedad Entomológica Argentina | REV SOC ENTOMOL ARGE | Entomology | 0373-5680 | Sociedad Entomológica Argentina/Biotaxa/SciELO | DOA |
| Revue Suisse de Zoologie | REV SUISSE ZOOL | Zoology | 0035-418X | BioOne/Muséum d’histoire naturelle, Genève | DOA |
| Russian Journal of Herpetology | RUSS J HERPETOL | Zoology | 2713-1467 | Folium Publishing Company | Hybrid/APC-GOA |
| Russian Journal of Nematology | RUSS J NEMATOL | Zoology | 0869-6918 | RUSSIAN ACAD SCI, INST PARASITOLOGY | Hybrid/APC-GOA |
| South American Journal of Herpetology | SAM J HERPETOL | Zoology | 1808-9798 | BioOne/Brazilian Society of Herpetology | DOA [?]|
| Journal Title                  | Abbreviation    | Subject         | Volume - Issn     | Publisher/Owner                      | Type         |
|-------------------------------|-----------------|-----------------|-------------------|--------------------------------------|--------------|
| Salamandra                    | SALAMANDRA      | Zoology         | 0036-3375         | German Society for Herpetology and Herpetoculture Sociedad Hispano-Luso-Americana de Lepidopterología España | APC-GOA      |
| Shilap-Revista de Lepidopterologia | SHILAP REV LEPIDOPT | Entomology     | 0300-5267         | Verlag Dr. Friedrich Pfeil          | DOA          |
| Southwestern Entomologist     | SOUTHWEST ENTOMOL | Entomology     | 0147-1724         | BioOne/Society of Southwestern Entomologists | Hybrid/APC-GOA |
| Spixiana                      | SPIXIANA        | Zoology         | 341-8391          | John Wiley & Sons                   | Hybrid/APC-GOA |
| Studies on Neotropical Fauna and Environment Systematic and Applied Acarology Systematic Entomology | STUD NEOTROP FAUNA E SYST APPL ACAROL SYST ENTOMOL | Entomology | 0165-0521 | BioOne/Systematic and Applied Acarology Society | Hybrid/APC-GOA |
| Transactions of the American Entomological Society Turkish Journal of Zoology Vertebrate Zoology | T AM ENTOMOL SOC TURK J ZOOL VERTEBR ZOOL | Zoology | 1300-0179 | Scientific and Technological Research Council of Turkey Senckenberg Gesellschaft für Naturforschung | Hybrid/APC-GOA |
| ZooKeys                       | ZOOKEYS         | Zoology         | 1313-2989         | Pensoft Publishers                  | DOA          |
| Zoologischer Anzeiger         | ZOOL ANZ        | Zoology         | 0044-5231         | Elsevier B.V.                       | Hybrid/APC-GOA |
| Zoological Journal of the Linnean Society Zoological Letters Zoology in the Middle East Zoological Research | ZOOL J LINN SOC LOND ZOOL LETT ZOOL MIDDLE EAST ZOOL RES | Zoology | 0024-4082 | Oxford University Press | Hybrid/APC-GOA |
| Zoological Science            | ZOOL SCI        | Zoology         | 0289-0003         | BioOne/Zoological Society of Japan | Hybrid/APC-GOA |
| Zoologica Scripta             | ZOOL SCR        | Zoology         | 0300-3256         | John Wiley & Sons                   | Hybrid/APC-GOA |
| Zoological Studies            | ZOOL STUD       | Zoology         | 1021-5506         | Biodiversity Research Center, Academia Sinica, Taiwan MAIK Nauka-Interperiodica PUBL | DOA          |
| Zoologichesky Zhurnal         | ZOOL ZH [merged with Annales Zoologici Fennici] | Zoology | 0044-5134 | Unknown | Unknown |
| Zoologia                      | ZOOLOGIA CURITIBA | Zoology       | 1984-4670         | Pensoft Publishers                  | APC-GOA      |
| Zoology                       | ZOOLOGY         | Zoology         | 0944-2006         | Elsevier B.V.                       | Hybrid/APC-GOA |
| Zoosystematics and Evolution Zootaxa | ZOOSYST EVOL ZOOTAXA | Zoology     | 1435-1935         | Pensoft Publishers                  | DOA          |
|                              |                 |                 | 1175-5326         | Magnolia Press                      | Hybrid/APC-GOA |
Figure 1. Amount of citations including all journals (blue), from most-citing journal (yellow), and self-citations (red) in the category Zoology from Journal Citation Reports (JCR) Science Edition database in Clarivate. * The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.
Figure. 2. Amount of citations including all journals (green), from most-citing journal (yellow), and self-citations (red) in the category Entomology from Journal Citation Reports (JCR) Science Edition database of Clarivate. * The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.
Figure. 3. Amount of citations including all journals (blue), from most-citing journal (yellow), and self-citations (red) for the top ten zoological journals (TTJ, eight are on JCR) when the number of new available names is considered. Journal Citation Reports (JCR) Science Edition database of Clarivate. *The data of most-citing journal is from Zootaxa; except for Zootaxa where it is ZooKeys.

Figure. 4. Evolution of percentage of journal-level self-citation in Zootaxa based on JCR/Clarivate 2019.
Figure 5. Mean percentage (dot) and standard deviation (line) of self-citations from 2010 to 2018 based on JCR/Clarivate 2019.

Figure 6. Mean of the ratio between JIF without self-citations and JIF (dot) and standard deviation (line) of journal impact factor (JIF) without self-citations from 2010 to 2018 based on JCR/Clarivate 2019.
**Supplementary File 1**

Bibliometric data from 2010–2018 of the 123 selected journals among the 168 journals in Zoology and 101 in Entomology, plus top ten zoological journals (TTJ), eight are on JCR) available in the Web of Science Core Collection, Journal Citation Reports (JCR) Science Edition database of Clarivate.

Journal;Category JCR;Status;Quartile 2019 (*Zootaxa 2018);Metrics;

All Yrs;2019;2018;2017;2016;2015;2014;2013;2012;2011;2010;Rest;2010-2018;2014-2018;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;ALL citations;19280;0;640;1892;2097;2003;1983;1783;1592;1571;1354;1069;14915;8615;2011;2010;Rest;2010-2018;2014-2018;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;ALL citations (excluding self and most);12076;0;251;966;1216;1166;1284;1146;1023;1115;902;792;9069;4883;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;Self-citation;6174;0;337;818;763;719;603;544;486;393;379;277;5039;3240;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;Ratio of self-citations;0.320228216;#DIV/0!;0.5265625;0.432346723;0.359861558;0.30408472;0.305103758;0.305276382;0.248249523;0.279911374;0.259120674;0.12434966;1.985808624;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;JIF;0;0,768;1,042;0,837;0,775;0,408;0;0;0;0;0;0;3,062;3,062;

**ZOOTAXA;ZOOLOGY**;Top Ten;3;JIF (without self-citations);0;0,705;1,01;0,772;0,716;0,342;0;0;0;0;0;0;2,84;2,84;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;ALL citations;1583;10;35;38;87;69;60;42;63;69;97;1013;560;289;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;ALL citations (excluding self and most);1500;8;29;36;86;67;58;41;60;66;92;957;535;276;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;Self-citation;38;1;5;1;1;1;1;1;1;1;1;2;1;1;1;1;2;1;1;23;14;9;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;Ratio of self-citations;0.024005054;0,1;0,142857143;0,026315789;0,011494253;0,014492754;0,016666667;0,023809524;0,031746032;0,014492754;0,010309278;0,022704837;0,292184193;0,211826605;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;JIF;0;0,768;1,042;0,837;0,775;0,408;0;0;0;0;0;0;3,062;3,062;

**ACTA AMAZON;ZOOLOGY**;ZOOLOGY;3;JIF (without self-citations);0;0,705;1,01;0,772;0,716;0,342;0;0;0;0;0;0;2,84;2,84;

**ACTA CHIROPTEROL;ZOOLOGY**;ZOOLOGY;3;ALL citations;824;2;9;36;86;67;58;41;60;66;92;957;535;276;
| Publication Title          | Year | JIF (without self-citations) | Ratio of self-citations | All citations excluding self and most |
|---------------------------|------|-------------------------------|--------------------------|--------------------------------------|
| AM MUS NOVIT; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.671                    | 0.294; 0.0459288; 0.398204644; 0.256524858; |
| ANN CARNEGIE MUS; ZOOLOGY; ZOOLOGY | 3    | 1.500                         | 0.361                    | 0.563; 0.857; 0.563; 0.134; 0.204; 0.256; 0.313; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| ANN HERPETOL RES; ZOOLOGY; ZOOLOGY | 3    | 1.000                         | 0.500                    | 0.500; 0.100; 0.500; 0.100; 0.100; 0.100; |
| Journal                      | Category | Subcategory | Year | Total Citations | Citations (excluding self and most) | Citations (self-citation) | Ratio of self-citations | JIF | JIF (without self-citation) |
|------------------------------|----------|-------------|------|-----------------|--------------------------------------|--------------------------|-----------------------|-----|----------------------------|
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; ALL citations | 528; 2; 15; 10; 28; 28; 19; 14; 19; 20; 14; 32; 13; 123; 944 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; ALL citations (excluding self and most) | 399; 2; 8; 21; 21; 29; 15; 13; 17; 14; 258; 139; 80 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; ZOOTAXA | 124; 0; 6; 9; 7; 7; 13; 14; 4; 6; 6; 5; 72; 42 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; Self-citation | 5; 0; 1; 0; 0; 0; 0; 1; 0; 3; 2; 1 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; 2; Ratio of self-citations | 0.009469697; 0.066666667; 0.04; 0.014666667; 0.009584665; 0.108333333; 0.066666667; 0.1 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; ZOOTAXA | 124; 0; 6; 9; 7; 7; 13; 14; 4; 6; 6; 5; 72; 42 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; Self-citation | 5; 0; 1; 0; 0; 0; 0; 1; 0; 3; 2; 1 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; 2; Ratio of self-citations | 0.009469697; 0.066666667; 0.04; 0.014666667; 0.009584665; 0.108333333; 0.066666667; 0.1 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; ZOOTAXA | 124; 0; 6; 9; 7; 7; 13; 14; 4; 6; 6; 5; 72; 42 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; ZOOLOGY; 2; Self-citation | 5; 0; 1; 0; 0; 0; 0; 1; 0; 3; 2; 1 | | | | | | | | |
| ICHTHYOL EXPLOR FRES; ZOOLOGY; 2; Ratio of self-citations | 0.009469697; 0.066666667; 0.04; 0.014666667; 0.009584665; 0.108333333; 0.066666667; 0.1 | | | | | | | | |
| Journal | Zoology | Self | Ratio of self- | ALL citations (excluding self and most) | JIF (without self-citations) | JIF (excluding self) | Zootaxa |
|---------|---------|------|---------------|----------------------------------------|-----------------------------|-----------------------|---------|
| J Conchol | Zooology | 3 | 227 | 0.5; 21; 9; 8; 7; 9; 4; 8; 14; 142; 85; 50; | | | |
| J Conchol | Zooology | 3 | Zootaxa | 0; 1; 0; 0; 0; 2; 1; 2; 0; 0; 0; 0; 13; 5; 3; | | | |
| J Conchol | Zooology | 3 | Self-citation | 18; 0; 1; 2; 1; 1; 0; 1; 0; 10; 8; 6; | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
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| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |
| J Conchol | Zooology | 3 | | | | | |

Note: The table above contains entries from various journals related to zooology and self-citation rates, along with JIF (journal impact factor) and Zootaxa data. The entries are for different years, with specific ranges and values provided.
| Journal                        | Top Ten       | Publications Type                  | All Publications | Self-citations | Ratio of self-citations | JIF (without self-citations) | Ratio of self-citations |
|-------------------------------|---------------|-----------------------------------|------------------|----------------|-------------------------|-------------------------------|-------------------------|
| SALAMANDRA;ZOOLOGY;ZOOLOGY;ZOOLOGY;2 | Self-citation | 22,06:0,2;2,1;1,0;1,1;1,8;14,11; |                  |                |                         |                               |                         |
| SALAMANDRA;ZOOLOGY;ZOOLOGY;ZOOLOGY;2 | Ratio of self-citations | 0,054187192;0,146341463;0,066666667;0,071428571;0,040,058823529;0,066666667;0,052631579;0,050632911;0,502558477;0,324436702; |                |                |                         |                               |                         |
| SPIXIANA;ZOOLOGY;ZOOLOGY;ZOOLOGY;4 | ALL citations | 323,2;16,11;19,12,15;9,20,8,201;120,68; |                  |                |                         |                               |                         |
| SPIXIANA;ZOOLOGY;ZOOLOGY;ZOOLOGY;4 | JIF (excluding self and most) | 1,532;1,313;1,46;1,25;1,25;1,1;1,229;1,0;0,8,602;6,373; |                |                |                         |                               |                         |
| SPIXIANA;ZOOLOGY;ZOOLOGY;ZOOLOGY;4 | Ratio of self-citations | 0,054187192;0,146341463;0,066666667;0,071428571;0,040,058823529;0,066666667;0,052631579;0,050632911;0,502558477;0,324436702; |                |                |                         |                               |                         |
| SPIXIANA;ZOOLOGY;ZOOLOGY;ZOOLOGY;4 | JIF (without self-citations) | 0,054187192;0,146341463;0,066666667;0,071428571;0,040,058823529;0,066666667;0,052631579;0,050632911;0,502558477;0,324436702; |                |                |                         |                               |                         |
| VERTEBR ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | ALL citations | 208;10;21;26;29;25;10;19,8;5,34;164;122; |                |                |                         |                               |                         |
| VERTEBR ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | Self-citation | 9;1;1;1;1;0;1;0;0;1;2,6;4; |                |                |                         |                               |                         |
| VERTEBR ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | Ratio of self-citations | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| VERTEBR ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | JIF (without self-citations) | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| VERTEBR ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | JIF (without self-citations) | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | Top Ten | 5138;146;115;4796;3033; |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | ALL citations (excluding self and most) | 3727;104,434;377;458;471;388;378;358;578;95;86;3537;2128; |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | Self-citation | 595;92;94;68;90;55;48;58;25;32;19;48;355; |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | Ratio of self-citations | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | JIF (without self-citations) | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | JIF (without self-citations) | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| ZOOKEYS;ZOOLOGY;ZOOLOGY;ZOOLOGY;3 | JIF (without self-citations) | 0,022065331;0,181818182;0,02;0,02,0,027027027;0,034782609;0,015873016;0,03125;0,014492754;0,0263 |                |                |                         |                               |                         |
| Journal/Region | Category | All Citations | Self-Citation | JIF | Top Ten Citations |
|----------------|----------|---------------|---------------|-----|------------------|
| ZOO ANZ | ZOOLOGY | ALL citations | 2084 | 53 | 99 | 136; 127; 85; 55; 92; 41; 45; 45; 1306; 725; 502 |
| ZOO ANZ | ZOOLOGY | ALL citations (excluding self and most) | 1639; 27; 90; 120; 87; 74; 50; 77; 29; 39; 39 | 1007; 605; 421 |
| ZOO ANZ | ZOOLOGY | Self-citation | 122; 22; 1; 8; 30; 0; 2; 11; 9 | 1; 3; 35; 85; 41 |
| ZOO ANZ | ZOOLOGY | Ratio of self-citation | 0.022222222; 0.066666667; 0.026793897; 0.76947495; 0.341508648 |
| ZOO ANZ | ZOOLOGY | Self-citation | 0.1; 314; 1; 497; 1; 1269; 1; 137; 1; 419; 1; 414; 1; 1731; 1; 3; 1; 341; 1; 692; 0; 12; 8; 6; 736 |
| ZOO J LINN SOC LOND | ZOOLOGY | Top Ten Citations | 1; ALL |
| ZOO J LINN SOC LOND | ZOOLOGY | All citations (excluding self and most) | 5024; 110; 268; 263; 302; 270; 239; 193; 217; 268; 231; 2663; 2251; 1342 |
| ZOO J LINN SOC LOND | ZOOLOGY | Self-citation | 208; 8; 10; 12; 19; 12; 17; 8; 9; 21; 83; 117; 70 |
| ZOO J LINN SOC LOND | ZOOLOGY | Ratio of self-citation | 0.037056832; 0.055944056; 0.031847134; 0.040540541; 0.054755043; 0.03986711; 0.060498221; 0.037735849; 0.036734694; 0.068403909; 0.036144578; 0.02844144; 0.040527078; 0.0227508048 |
| ZOO J LINN SOC LOND | ZOOLOGY | Top Ten Citations | 1; JIF |
| ZOO J LINN SOC LOND | ZOOLOGY | Top Ten (excluding self and most) | 0.02; 824; 2; 909; 2; 685; 2; 711; 2; 316; 2; 717; 2; 658; 2; 583; 2; 433; 2; 319; 0; 23; 331; 13; 338 |
| ZOO MIDDLE EAST | ZOOLOGY | Top Ten Citations | 0; 0; 122 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations | 490; 11; 15; 26; 41; 25; 54; 20; 28; 30; 27; 213; 266; 161 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations (excluding self and most) | 440; 7; 13; 19; 36; 20; 48; 20; 25; 27; 27; 199; 234; 136 |
| ZOO MIDDLE EAST | ZOOLOGY | Self-citation | 2; 0; 1; 0; 0; 0; 0; 0; 0; 0; 0; 0; 2; 1 |
| ZOO MIDDLE EAST | ZOOLOGY | Ratio of self-citation | 0.04081633; 0; 0.06666667; 0; 0; 0; 0; 0; 0.035714286; 0; 0; 0.002380952; 0.6666667 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations (excluding self and most) | 688; 31; 60; 80; 55; 44; 50; 41; 30; 27; 38; 232; 425; 289 |
| ZOO MIDDLE EAST | ZOOLOGY | Self-citation | 1; 81; 17; 12; 10; 16; 7; 5; 1; 0; 1; 1; 11; 53; 50 |
| ZOO MIDDLE EAST | ZOOLOGY | Ratio of self-citation | 0.096889952; 0.314814815; 0.151898734; 0.097087379; 0.205128205; 0.134615385; 0.089285714; 0.022727273 |
| ZOO MIDDLE EAST | ZOOLOGY | Self-citation | 0; 0; 0.034482759; 0.025641026; 0.040590406; 0.706866474; 0.678015417 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations (excluding self and most) | 0.0; 0.4; 629; 0.472; 0.455; 0.543; 0.355; 0.46; 0.381; 0.392; 0.313; 0.4; 2.454 |
| ZOO MIDDLE EAST | ZOOLOGY | Self-citation | 1; 836; 54; 79; 103; 78; 52; 56; 44; 31; 29; 39; 271; 511; 368 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations (excluding self and most) | 688; 31; 60; 80; 55; 44; 50; 41; 30; 27; 38; 232; 425; 289 |
| ZOO MIDDLE EAST | ZOOLOGY | Self-citation | 1; 81; 17; 12; 10; 16; 7; 5; 1; 0; 1; 11; 53; 50 |
| ZOO MIDDLE EAST | ZOOLOGY | All citations (excluding self and most) | 2383; 8; 35; 62; 74; 70; 103; 132; 120; 116; 112; 1551; 824; 344; |
| Journal                        | Year | All Citations | All Citations (excluding self and most) | Zootaxa | Self-citation | Ratio of self-citations | JIF        | JIF (without self-citations) |
|-------------------------------|------|---------------|----------------------------------------|---------|----------------|------------------------|------------|-------------------------------|
| Asian Myrmecol; Entomology; Entomology | 4    | 42            | 42                                      | 0       | 0              | 0                      | 0.621; 0.429; 0.25; 0.625; 0.867; 0.630; 3.9 | 0.621; 0.429; 0.25; 0.625; 0.867; 0.630; 3.9 |
| Austral Entomol; Entomology  | 2    | 20            | 20                                      | 0       | 0              | 0                      | 1.552; 1.769; 1.341; 1.114 | 1.552; 1.769; 1.341; 1.114 |
| Coleopta Bull; Entomology    | 4    | 21            | 21                                      | 0       | 0              | 0                      | 0.621; 0.429; 0.25; 0.625; 0.867; 0.630; 3.9 | 0.621; 0.429; 0.25; 0.625; 0.867; 0.630; 3.9 |

Note: The table continues with similar entries for other journals and years.
J ENTOMOL RES SOC;ENTOMOLOGY;ENTOMOLOGY;4;ZOOTAXA;14;0;0,1;5;0,0;0;1,2;5;9;6;
J ENTOMOL RES SOC;ENTOMOLOGY;ENTOMOLOGY;4;Self-citation;7;0;0;0,1;2;0,0;3,0;1,0;7,3;
J ENTOMOL RES SOC;ENTOMOLOGY;ENTOMOLOGY;4;Ratio of self-
citations;0,058333333;0,0;0,066666667;0,333333333;0,0;0,1875;0,0,125;0,0,7125;0,4;
J ENTOMOL RES
SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF;0,0;0,328;0,182;0,293;0,266;0,181;0,4;0,347;0,275;0,365;0,2;0,2;509;1,322;
J ENTOMOL RES SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF (without self-
citation);0,0,328;0,167;0,293;0,234;0,181;0,314;0,267;0,174;0,25;0,175;0,2,0,055;1,189;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;ALL citations;574;17;46;69;53;61;29;36;33,10;17;203;354;258;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;ALL citations (excluding self and
most);418;10;31;44;33;47;20;29;27;8,15;154;254;175;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;ZOOTAXA;77;1;6;13;9,5;4;1,2;1,30;46;38;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;Self-citation;79;6;9;12;11;9;4;3,5;0,1;19,54;45;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;Ratio of self-
citations;0,137630662;0,352941176;0,195652174;0,173913043;0,20754717;0,147540984;0,137931034;0,083333333;
0,151515152;0,0,058823529;0,093596059;1,15625642;0,862584405;
J HYMENOPT RES
SOC;ENTOMOLOGY;ENTOMOLOGY;2;JIF;0,1;1,322;0,939;0,902;0,793;0,783;0,903;0,966;0,524;0,531;0,5;0,6,841;4,32;
J HYMENOPT RES;ENTOMOLOGY;ENTOMOLOGY;2;JIF (without self-
citation);0,1,08;8,027;0,745;0,69;0,71;8,33;0,475;0,333;0,5;0,341;0,5,464;3,805;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;ALL
citations;1376;1,2;17;19;32;14,23;29;13;20;1206;169;84;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;ALL citations (excluding self and
most);1241;1,2;17;18;23;12;22;27;12;18;1089;151;72;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;ZOOTAXA;135;0;0,0;1,9;2;1,2;1,2;117;18;12;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;Self-citation;0,0;0,0;0,0;0,0;0,0;0,0;0;0;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;Ratio of self-citations;0,0;0,0;0,0;0,0;0,0;0,0;
J KANSAS ENTOMOL
SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF;0,0;0,292;0,216;0,299;0,505;0,277;0,539;0,397;0,551;0,493;0,653;0,3,93;1,836;
J KANSAS ENTOMOL SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF (without self-
citation);0,0,292;0,189;0,299;0,418;0,231;0,474;0,346;0,526;0,384;0,611;0,3,478;1,611;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;ALL citations;500;1,22;29;20;21;21;14,12;11,4;345;154,113;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;ALL citations (excluding self and
most);404;1,15;24;18;15;14;12;11;10,3,281;122;86;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;ZOOTAXA;32;0,2;2;0,1;3,0;0,1,0;23;9,8;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;Self-citation;64;0;5,3;2,5;4,2,1;1,41,23;19;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;Ratio of self-
citations;0,128;0,0,227727277;0,103448276;0,1;0,238095238;0,19047619;0,142857143;0,083333333;0,0,25;0,11884;
0,58,1,335482908;0,859292432;
J LEPID
SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF;0,0;0,646;0,518;0,463;0,474;0,38;0,515;0,333;0,219;0,267;0,559;0,3,728;2,35;
J LEPID SOC;ENTOMOLOGY;ENTOMOLOGY;4;JIF (without self-
citation);0,0,544;0,386;0,4,0,382;0,354;0,333;0,27;0,125;0,233;0,525;0,3,008;1,855;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;ALL citations;615;3,35;75;44;12;69;47;81;53;37;159;453;235;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;ALL citations (excluding self and
most);573,2;32;70,39;10,64;46;77;50;35,148;423;215;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;ZOOTAXA;17,0;1,3;3,0;2;0,2,3;1,2;15,9;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;Self-citation;25;1,2,2;2,2,3,1;0,1,9,15,11;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;Ratio of self-
citations;0,040650407;0,333333333;0,057142857;0,026666667;0,045454545;0,166666667;0,043478261,0,021276596;
0,024691358;0,0,027027027;0,056603774;0,412040398;0,339408997;
MYRMECOL
NEWS;ENTOMOLOGY;ENTOMOLOGY;1;JIF;0,2,558;2,619;1,838;1,805;2,386;2,898;1,582;2,157;2,644;0,0,17,929;11,54;
MYRMECOL NEWS;ENTOMOLOGY;ENTOMOLOGY;1;JIF (without self-
citation);0,2,465;2,167,1,568;1,463;2,159;2,265;1,373;1,549;2,0,0,14,544,9,622;
NEOTROP ENTOMOL;ENTOMOLOGY;ENTOMOLOGY;2;ALL
citations;2079;51;121;117;106,60;79,90;76;167,178;1034;994,483;
| Year | Journal | Category | ALL citations (excluding self and most) | ZOOTAXA citations | Self-citation citations | Ratio of self-citation citations | JIF | JIF (without self-citation citations) |
|------|---------|----------|----------------------------------------|-------------------|------------------------|-------------------------------|-----|-------------------------------------|
| 1882 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 2 | 1903; 29; 106; 100; 99; 55; 74; 81; 86; 168; 166; 965; 909; 434; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1883 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 2 | 1904; 70; 7; 5; 3; 4; 2; 3; 3; 3; 3; 34; 29; 17; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1884 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 2 | Self-citation; 106; 15; 10; 14; 4; 1; 3; 6; 5; 4; 9; 35; 56; 32; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1885 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 2 | Ratio of self-citation; 0; 050986051; 0; 28644628; 0; 11965812; 0; 037735849; 0; 01666667; 0; 037974684; 0; 06666667; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1886 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 3 | 1887; 1888; 1889; 1890; 1891; 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1887 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 3 | 1888; 1889; 1890; 1891; 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1888 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 3 | 1889; 1890; 1891; 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1889 | NEOTROP ENTOMOL; ENTOMOLOGY; ENTOMOLOGY | 3 | 1890; 1891; 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1890 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1891; 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1891 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1892; 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1892 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1893; 1894; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1893 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1894; 1895; 1896; 1897; 1898; 1899; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1894 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1895; 1896; 1897; 1898; 1899; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1895 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1896; 1897; 1898; 1899; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1896 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1897; 1898; 1899; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1897 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1898; 1899; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1898 | NZ ENTOMOL; ENTOMOLOGY | 4 | 1899; 2000; 2001; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 1899 | NZ ENTOMOL; ENTOMOLOGY | 4 | 2001; 2002; 2003; 2004; 2005; 2006; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 2000 | NZ ENTOMOL; ENTOMOLOGY | 4 | 2001; 2002; 2003; 2004; 2005; 2006; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 2001 | NZ ENTOMOL; ENTOMOLOGY | 4 | 2002; 2003; 2004; 2005; 2006; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 2002 | NZ ENTOMOL; ENTOMOLOGY | 4 | 2003; 2004; 2005; 2006; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| 2003 | NZ ENTOMOL; ENTOMOLOGY | 4 | 2004; 2005; 2006; | 0; 0 | 0; 0 | 0; 0 | 0; 0 | 0; 0 |
| Year | Journal                                      | Impact Factor | Self-Citation | Ratio of self-citation | All Citations | JIF (without self-citations) |
|------|----------------------------------------------|---------------|---------------|------------------------|---------------|------------------------------|
| 1998 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 1999 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2000 | SHILAP REV LEPIDOPT; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2001 | SYST APPL ACAROL UK; ENTOMOLOGY; Top Ten    | 2             |               |                        |               |                              |
| 2002 | SYST APPL ACAROL UK; ENTOMOLOGY; Top Ten    | 2             |               |                        |               |                              |
| 2003 | SYST APPL ACAROL UK; ENTOMOLOGY; Top Ten    | 2             |               |                        |               |                              |
| 2004 | SHILAP REV LEPIDOPT; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2005 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2006 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2007 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2008 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2009 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2010 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2011 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2012 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2013 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2014 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2015 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2016 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2017 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2018 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2019 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2020 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2021 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2022 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2023 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |
| 2024 | REV SOC ENTOMOL ARGE; ENTOMOLOGY; ENTOMOLOGY | 4             |               |                        |               |                              |

Note: The table above lists the top ten journals in terms of impact factor, self-citation ratio, and all citations. The specific values are not provided in the image.
