

Editorial

All that glitters is not gold: The world of scientific publications and the challenges of publishing high-quality research

The world of scientific publishing has changed dramatically in the last few years. The number of scientific journals has increased at an unprecedented rate, as well as the number of published papers. Some of us remember the times when manuscripts were sent by snail mail to the Editor in Chief of a journal, and you then received the corrections and comments by the reviewers hand-written with a fountain pen on the pages returned to you, again, by snail mail. This was actually how I published my first paper in the *Journal of Applied Ecology* (Ambrosini et al. 2002). Within a couple of years, that system disappeared, replaced by online submission systems. At that time, this change seemed like a revolution, but it was nothing compared to what is happening today.

The proliferation of scientific journals can be seen as the response of publishers to the necessity for many researchers from Countries that in the past were almost excluded from scientific publications to publish their results. To sustain this effort, publishers have exploited the open access system to a great extent. Open access (OA) has been conceived and has been publicized as a way to make science more democratic. Indeed, before OA, only scientific institutes from rich countries could afford the costs of paying subscription fees to many journals, while a large part of the world, including non-professional researchers, simply could not access scientific publications. Journals were costly, particularly when they

were printed on paper and sent by snail mail all over the world. This constrained the number of existing journals and only those able to attract great attention in their field survived the fierce competition of the scientific journal market. Indeed, scientific institutes paid subscription fees only for those journals that they considered relevant to their field of research, and the more a journal was read, the more publishers gained money.

This system, in turn, had the effect of increasing the competition for what was worth publishing. To gain attention and relevance, journals were pushed to publish chiefly papers describing great new discoveries (the so-called “eureka papers”), and many interesting results simply could not find space in the scientific literature. Was this correct? Surely not. Indeed, not only eureka papers should be published. For instance, scientific discovery must be repeatable, so also papers that simply confirm previous findings are important for science. And what about reviews, case studies, negative results, dataset descriptions, or even anecdotal observations? As ornithologists, we should be aware of the importance of all these pieces of information. OA offers a solution to all these problems, as it allows researchers to decide what is worth publishing and what is not, and makes content available to everyone. It also makes publishers happy, as they gain for each published paper independently of its interest. Isn't it democratic and inclusive? Well, this system creates a disparity where a researcher's ability to publish papers is directly tied to the amount of funding he or she has. Consequently, it can disadvantage researchers from low-income countries or young researchers at the outset of their careers. To

overcome this problem, almost all publishers of OA journals offer waivers for researchers who cannot afford the cost of publication fees.

Is this a perfect solution to all problems? Not at all. Indeed, OA is a glamorous name that, I guess, was accurately chosen by some marketing experts to promote this system, but not all OA journals are the same. This name simply explains that what is published in that journal is freely accessible to anyone at no cost, but it doesn't unveil the other side of the story, i.e. who pays for publication. Most OA journals should be more properly called "gold open access", and are those where publication fees are paid by the authors. This is, I think, another masterpiece of marketing because "gold" has usually a positive connotation, referring to something of great value. However, I'd prefer to give "gold" a slightly different meaning, which becomes clear if we think that this pay-to-publish – or more technically, Article Processing Charge (APC) – system is a real gold mine for publishers. Admittedly, it is quite hard to assess from publicly available information the income generated to publishers by OA journals, particularly for those that publish both pay-to-read and pay-to-publish journals. It is probably easier to look at the revenues of OA-only scientific publishers, the most well-known – and probably also the most important – which is MDPI, the Multidisciplinary Digital Publishing Institute (www.mdpi.com). Founded in Basel, Switzerland, in 1996 as a non-profit institute for the promotion and preservation of the diversity of chemical compound samples, in 1997 MDPI took over the publishing of *Molecules* from Springer Verlag and started to publish it OA. *Molecules* published 74 papers in 1997. At the end of 2022, the number of journals published by MDPI has risen to 429, with 295,046 peer-reviewed articles published in that year only. It is not easy to assess the revenues of MDPI from the APC of all these papers, but Dan Brockington estimated they should have increased from 14,424,570 CHF (Swiss fanks) in 2015 to 294,291,488 CHF in 2021 (see <https://danbrockington.com/2022/11/10/mdpi-journals-2015-2021/>). In summary: OA is a big business.

OA journals thus set up a system where researchers are happy because, if they have enough money, they can publish their papers – aren't all researchers under pressure to 'publish or perish'? – and publishers are happy because they gain. Is this a win-win system? Not at all, because the convergent interests of the authors and the publishers push manuscripts toward acceptance, independently of their quality. I stress that I am referring here to the quality of a paper, not to its interest, as we already saw that not only eureka papers should be published. The problem is particularly worrisome when the interest in publishing (and invoicing) makes publishers jump over the peer review process, thus becoming "predatory journals" and "predatory publishers" i.e. "entities that prioritize self-interest at the expense of scholarship and are characterized by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices" (Grudniewicz et al 2019). Clear examples of predatory publications include a report of a COVID-19 outbreak in Cyllage City (the imaginary city of Pokémon) (Schlomi 2020) purposely written to test the peer-review system of the journal (the paper states: "Epidemiologists believe it is highly likely that a journal publishing this paper does not practice peer review and must therefore be predatory").

Researchers should be cautious of predatory journals and ensure they thoroughly research any journal they plan to submit to, favouring those which have a clear reputation and tradition in the field, and using resources such as the Directory of Open Access Journals (DOAJ) (<https://doaj.org>) or the "Think. Check. Submit." tool (<https://thinkchecksubmit.org/>), to ensure they are reputable and trustworthy. It is worth pointing out that Avocetta is listed in DOAJ and it conforms to the "Think. Check. Submit." checklist. However, it can be really difficult to assess whether a journal is predatory or not and a large "grey zone" exists (Grudniewicz et al 2019). Predatory journals and publishers are a peril for the scientific publication system, which is mostly based on reputation; in

particular, they are insidious for young and inexperienced researchers, eager to publish for not perishing in the fiercely competing world of academic research, and it is, therefore, important to make them aware of this risk. I must also state that a large debate exists on whether MDPI is a predatory publisher or not (Crosetto 2023) but I think entering this debate is out of the scope of this editorial.

Predatory journals are deviant from scientific integrity, but even a correctly managed gold OA system raises concerns. First, researchers pay for publishing (APC for a paper can reach 11,690 US dollars for Nature Neuroscience, a transformative journal i.e. a journal which is in transition between a pay-to-read to a pay-to-publish model and offers authors the opportunity to choose between the two systems; <https://www.nature.com/neuro/submission-guidelines/publishing-options>), most often using their grant funds, which is often public money. For instance, in 2022, the University of Milan paid 412.823 euros for APCs to MDPI only (<https://treemaps.openapc.net/apcdata/milano-u/#publisher/period=2022>). In addition, researchers serve as reviewers (i.e. experts that revise manuscripts during the peer-review process) and editors for scientific journals, most often for free. Publishers, in turn, gain, with low expenses: the vast majority of journals are no longer printed, and articles are pdfs available on a website. Publication costs are not null (web infrastructure, personnel, etc.) and are difficult to estimate, but the general feeling is that they can be easily covered by the APCs of a few papers. Recently, the entire editorial boards of two leading neuroscience journals (NeuroImage and NeuroImage: Reports published by the Dutch publisher Elsevier) have resigned in protest against APCs they considered “unethical and unsustainable” (Sanderson 2023).

OA has been claimed as the democratization of science and has been welcomed by science decision-makers. For instance, OA publication is mandatory for all Horizon and European Research Commission (ERC) grants (<https://erc.europa.eu/manage-your-project/open-science>). In contrast, many experienced re-

searchers feel that currently, in the world of scientific publications, OA is the gold mine of publishers, while scholars are the slaves that dig it. I have a bad feeling that it will be hard to change the status quo, given the big interests involved. However, something seems to have started moving. The EU has started the DIAMAS project (<https://diamasproject.eu/>) aiming at setting new standards for OA publishing in Europe. DIAMAS is currently giving special attention to journals and publishers that do not charge fees either for publishing or reading. This is indeed a different way to OA, sometimes called “diamond” OA. But publishing is costly, so who pays for diamond OA? Funders, scientific institutions or societies, or anybody that aims at making scientific publications really free for everybody (for reading and publishing) as well as free from the constraints of the market.

I am proud to say that Avocetta is a diamond OA journal, and I must thank all those that make this possible, first of all, CISO (the Italian Ornithological Centre), which fully funds the journal, an enthusiastic editorial team that makes its best to keep the cost of Avocetta as low as possible, including a professional paginator that formats Avocetta for free. Indeed, the economic sustainability of Avocetta has been at the centre of many discussions in the last months, and at the base of the decision to make it an online-only journal. This was not an easy decision, because many of us, including myself, still love browsing a journal in our hands. However, costs were unsustainable even considering the additional fee paid by CISO members that wanted to receive a printed copy of Avocetta. However, the cost of printing was not the main problem. This was already reduced by moving to a print-on-demand provider. The main problem was sending issues by snail mail, which was an unsustainably time-consuming process, vanished by the fact that about one-half of the sent issues were never received and needed to be sent again, thus increasing costs and making many of our readers angry. Transforming Avocetta into an online-only journal was the only viable solution. This, in turn, opened new opportunities for the journal. For instance, starting with this num-

ber, the two issues released in June and December will disappear and papers will be published immediately after they are accepted and edited, in a continuous publishing mode. This system also allows more flexibility in composing the issues, allowing, for instance, to include new paper types. Indeed, besides the other columns of Avocetta, we are planning – spoiler alert – to open a new one devoted to data papers, which will be officially announced soon. We hope this will further improve the quality and appeal of the journal.

The world of scientific publications is changing dramatically and quickly, and this poses challenges to all scientific journals, especially to the small ones that are not backed by big publishers, like Avocetta. However, I am convinced that pursuing scientific integrity with a diamond OA system will allow us to overcome these challenges, but only if more and more researchers choose Avocetta for presenting their research. We are waiting for your contributions.

References

- Ambrosini R., Bolzern A.M., Canova L., Arieni S., [...] & Saino N. 2002. The distribution and colony size of barn swallows in relation to agricultural land use. *Journal of Applied Ecology* 39: 524–534.
- Crosetto P. 2023. Is MDPI a predatory publisher? Available at: <https://paolocrosetto.wordpress.com/2021/04/12/is-mdpi-a-predatory-publisher/> (accessed 1 May 2023).
- Grudniewicz A., Moher D., Cobey K.D., Bryson G.L., [...] & Lalu M.L. 2019. Predatory journal: no definition, no defence. *Nature* 576: 210–212.
- Sanderson K. 2023. Editors quit brain research journals to protest against fees. *Nature* 616: 641.
- Schlomi M. 2020. Cyllage City COVID-19 outbreak linked to Zubat consumption. *American Journal of Biomedical Science & Research* 8(2): AJBSR.MS.ID.001256.

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Roberto Ambrosini - Editor-in-chief
*Department of Environmental Sciences and Policies,
Università degli Studi di Milano, via Celoria 23,
20133 Milan, Italy*

 0000-0002-7148-146