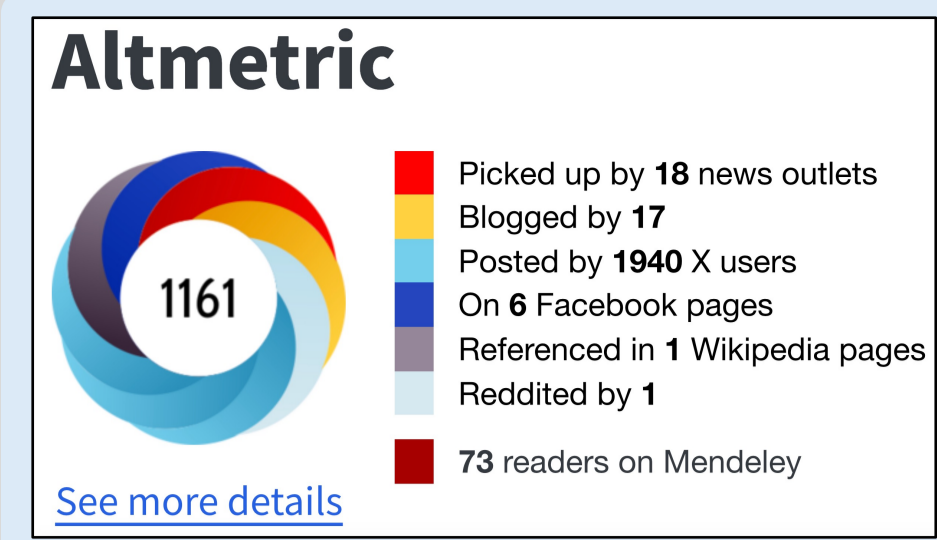


The strain on scientific publishing

Mark A. Hanson¹, Pablo Gomez-Barreiro², Paolo Crosetto³, Dan Brockington^{4,5,6}

1. Centre for Ecology and Conservation, Faculty of Environment, Science and Economy, University of Exeter, Penryn, TR10 9FE, United Kingdom
 2. Royal Botanic Gardens, Kew, Wakehurst, Ardingly, West Sussex RH17 6TN, United Kingdom
 3. Univ. Grenoble Alpes, INRAE, CNRS, Grenoble INP, GAEL, Grenoble 38000, France

4. Institut de Ciència i Tecnologia Ambientals (ICTA), Universitat Autònoma de Barcelona
 5. ICREA, Pg. Lluís Companys 23, Barcelona, Spain
 6. El Departament de Dret Privat, Universitat Autònoma de Barcelona

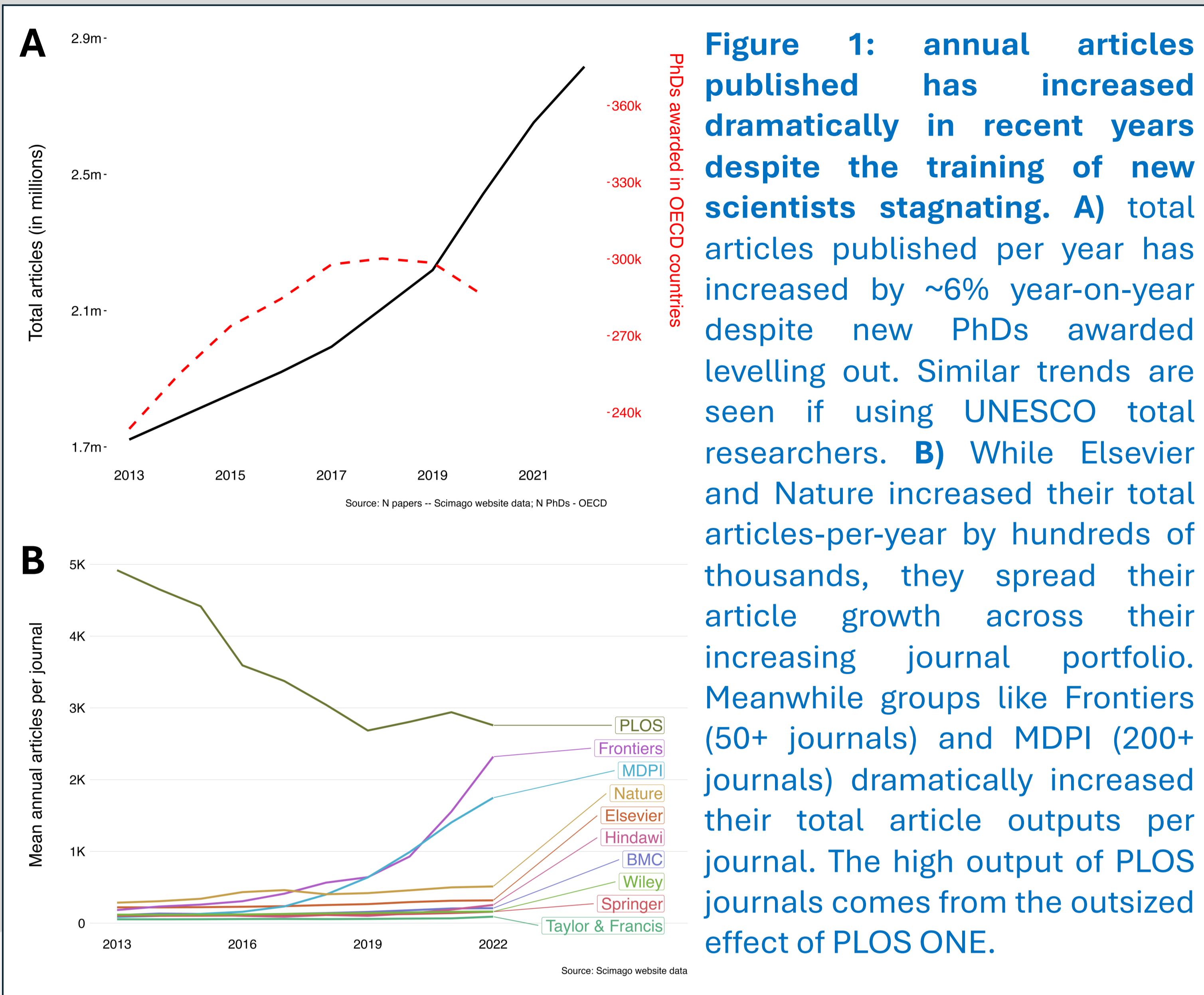


Accepted in Quantitative Science Studies (QSS) Aug 2024: QSS is a non-profit & society-run bibliometrics journal from MIT Press. QSS was founded after a universal walk-out of editors from the Elsevier-owned Journal of Infometrics (JoI) following Elsevier's price-gouging of Open Access fees and unwillingness to commit JoI to principles of Open Science.

For updates, check our website: <https://bit.ly/StrainWeb>

Introduction

There are too many papers being published every year, and this problem is only getting worse. In our dataset cataloguing thousands of journals, total indexed articles grew exponentially between 2016 (1.9m) and 2022 (2.8m), a ~47% increase in annual output (Figure 1). This growth is built on the backs of scientists facing “publish or perish” pressures, who write, review, and edit the work. We define this problem as “the strain on scientific publishing.”



Methods

In this study, we collected data from Scimagojr.com, requests to publishers, and we even web-scraped data from millions of articles. We use these data to provide a metrics-driven view of the state of science publishing.

Results

Groups like Elsevier and Nature have ever-increasing numbers of journals carrying their “brand,” enabling these groups to accept more papers overall but retain an air of selectivity. Others like Hindawi, Frontiers, and MDPI, adopted a strategy heavily focused on hosting “special issues”, which outsource much of their editing work to volunteer guest editors (Figure 2). We found special issue articles had reduced turnaround times and lower rejection rates. Moreover, groups like MDPI and Hindawi had signatures of citation-gaming, which comes from hosting ring-citing editors and authors, resulting in vastly inflated Journal Impact Factor compared to network-normalised rank metrics (Figure 3).

Number of papers published in regular vs special issues, 2016-22
 One square = 800 articles



Figure 2: certain publishers began hosting “special” issues as an engine for growth. These guest-edited collections are increasingly used by some publishers. 2022 average turnaround times (1st submit->accept) are given above each publisher.

Conclusion

Given pressures on researchers to publish or perish to be competitive for funding applications, the strain was likely amplified by offers to publish more articles in i) “special” issues, or ii) new journals that let publishers accept more articles overall. The metrics we define here enable this evolving conversation to reach actionable solutions to address the strain on scientific publishing.

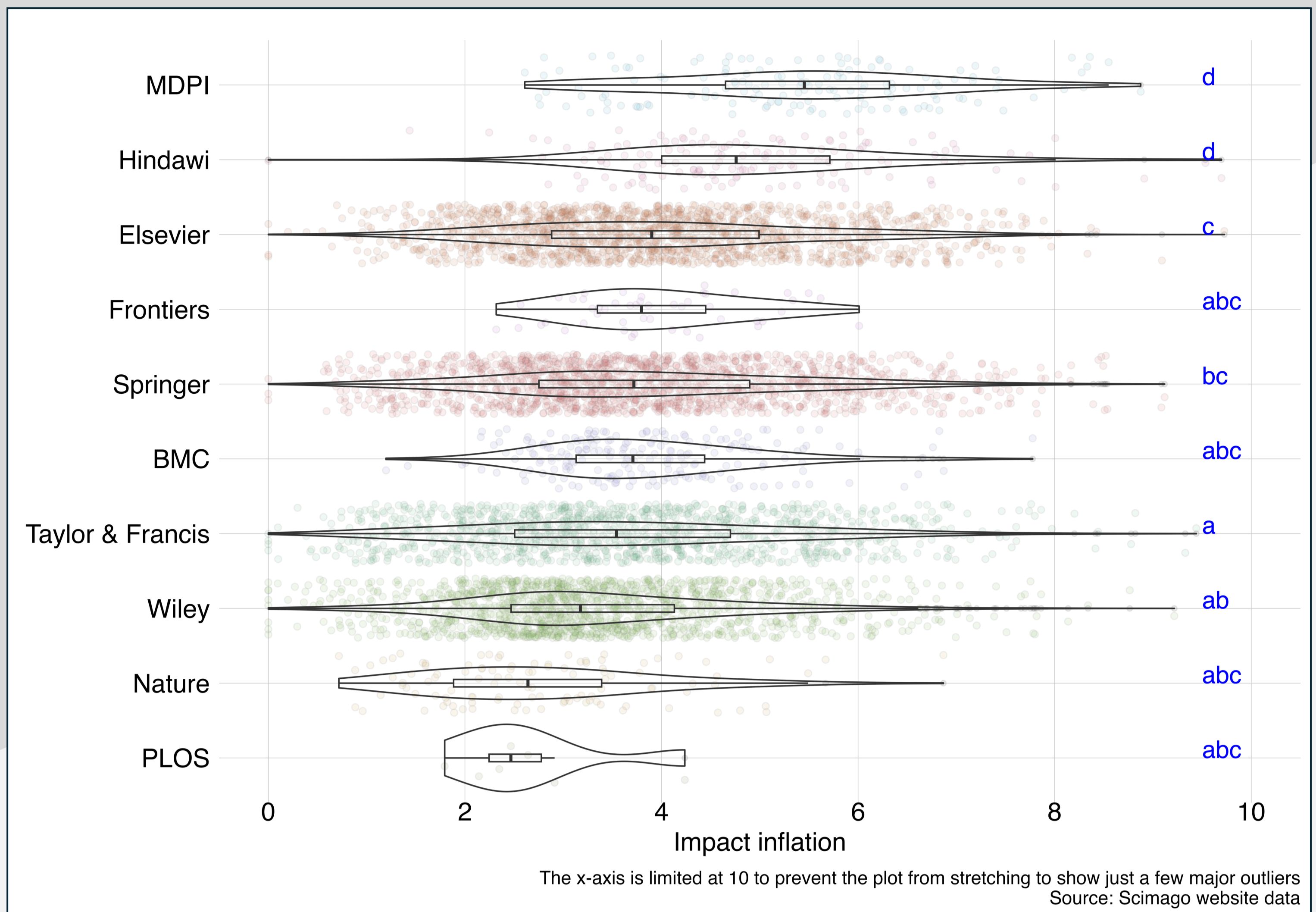


Figure 3: MDPI and Hindawi show signatures of citation gaming, inflating their Journal Impact Factor far beyond a citation network-adjusted journal rank. Impact Inflation here refers to the ratio of the Journal Impact Factor (Clarivate) to the Scimago Journal Rank (Scimago). Impact Factor rewards citations regardless of the source, whereas Scimago Journal Rank uses a citation network approach that prevents excessive self-citation and “citation cartel” behaviour from inflating the journal rank.

What can I do?

As of August 2024, this preprint is in the Top ~100 of >1,000,000 articles all-time on arXiv.org (AltMetric), has been covered in >10 languages, and helped inspire new policies around special issues (e.g. SNSF, DOAJ). People are engaged, and funders are listening: *it's time to act*.

If you want to host, we are happy to run publishing discussions/workshops online or in-person. You can find a recorded webinar here: <https://bit.ly/CGHEstrain>. The only way the next generation of scientists will learn what a healthy publishing landscape looks like is if we teach it, and if we practice it. A couple tools that can help:

1. **DAFNEE**: a searchable database of non-profit ecology and evolution journals that reinvest in the scientific community: <https://bit.ly/DAFNEE>
2. **The Strain Explorer app (Figure 4)**: we built an app that lets you explore our data! Any journals indexed in Scopus and Web of Science have Impact Inflation scores, and turnaround times are given for groups we could web scrape.

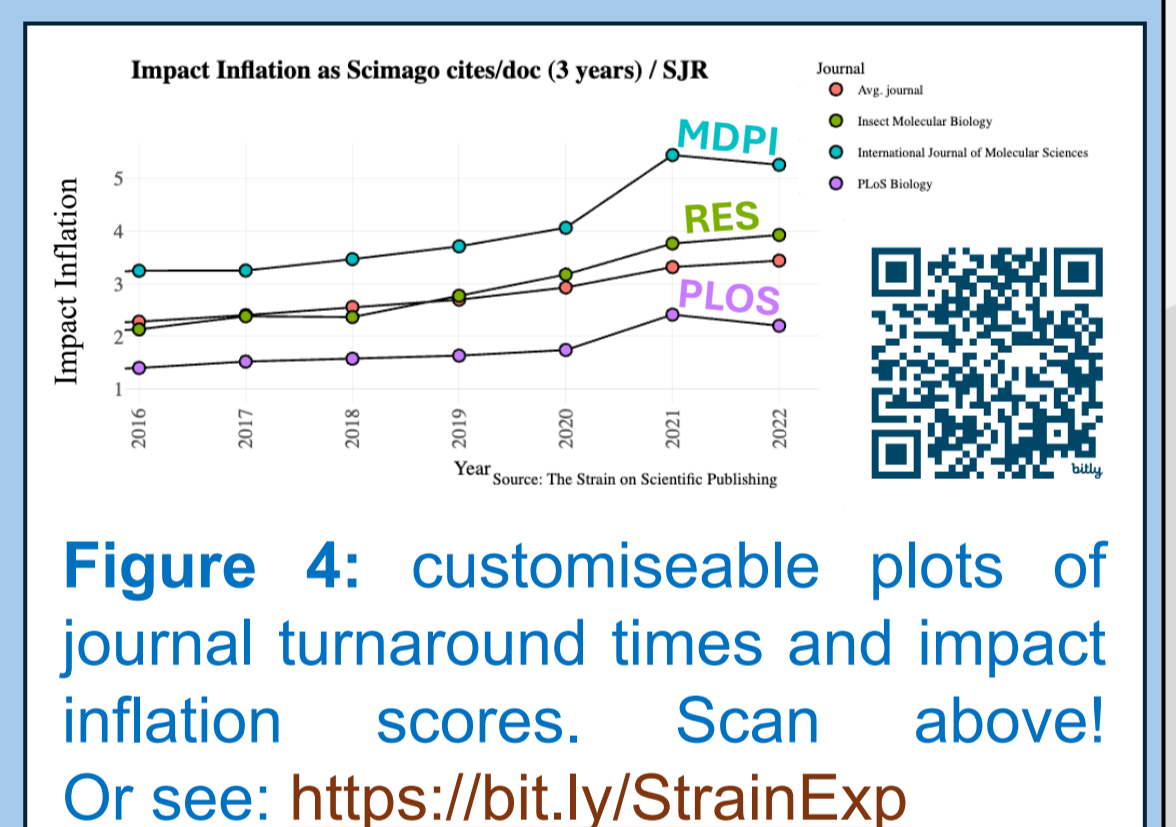


Figure 4: customisable plots of journal turnaround times and impact inflation scores. Scan above! Or see: <https://bit.ly/StrainExp>

What does my lab normally do?

Ecology-relevant bacteria drive the evolution of host antimicrobial peptides in *Drosophila*



Hanson et al. (2023; Science)

University of Exeter
 m.hanson@exeter.ac.uk
 @hansonmark.bsky.social
 @MarkHanson@fediscience.org



<https://bit.ly/mahpubs>

I am a Wellcome Early Career Fellow at the University of Exeter, Penryn (start Feb 2024). My group is interested in host-microbe interactions and molecular evolution. We use a panel of fruit fly species with sequenced genomes and powerful genetic tools to ask questions about immune evolution that would be impossible in any other model system; also interested to collaborate on insect immunity more broadly. I am further developing tools to study a fascinating selfish chromosome that implodes male testes (yay!). The lab will be recruiting students in the near future. **Interested to do an MSc/PhD?** Let's chat! Happy to support applications for post-doc fellowships. See: bit.ly/HansonLabJoin