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Impact factor: Playing a number on you

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Editorial

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Abstract

The impact factor has become a defining feature of scientific journals. However, such reductionism can be toxic to science. As Cambridge University Press *Quantitative Plant Biology* celebrates its 5-year anniversary, and its first impact factor, this is an opportunity to set things straight. A call to value what a scientific journal is about: a community of scientists, a guarantee of rigour and quality, an invitation to explore the complexity of our world, a fair and ethical environment and an engaging, diverse and creative arena.

"Impact" – This word is not without connotations. For instance, if I wanted to get a stronger impact with a newspaper, I would choose the thickest and largest format, I would roll it up and I would certainly be able to generate an impact as I hammer it on a fly. Impact is first and foremost a violent term.

Of course, today, when a journal gets an 'impact factor', that military rhetoric is forgotten, probably because many of us also forgot what war is about (Figure 1). The impact factor is a ranking tool for scientific journals. It was created by Eugene Garfield at the Institute for Scientific Information (ISI) in Philadelphia, USA. The first impact factors appeared in 1975, concomitantly with the rise of the economic neoliberal model, and consistently with the obsession of scientists for metrics. In short, the impact factor is 'a measure of the frequency with which the "average article" in a journal has been cited in a particular year or period (…) The [two-year] impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years' (ISI, 1994).

Because this tool provides a number, it also fuels reductionist thinking: one may assign the complex value of a journal to a single number. This can be pernicious. In fact, this is a well-established fact, whatever the metrics. The Goodhart law says it all: 'when a measure becomes a target, it ceases to be reliable'. The race for a high impact factor is no exception. It has produced:

- an inflation in the number of scientific publications (since more publications mean more citations),
- an increased pace of publications (to be able to produce more publications),
- and as a result, an increased conservatism in scientific discovery in the past decades, as shown by Park et al., in a seminal article (Park et al., 2023).

This race for producing and publishing articles in high-impact-factor journals has also facilitated many problematic feedback loops:

- an increased rate of fraud in scientific publications (because the increased pace reduces the ability of reviewers to control the contents) (Fang et al., 2012; Richardson et al., 2025),
- the proliferation of predatory journals, where (financial) impact prevails over (scientific) rigour and ethics (Laine et al., 2025),
- the definition of salaries and bonuses based on publications, using the impact factor as a rewarding tool (Owen, 2019),
- the scientific publishing financial boom (e.g., when Elsevier's profits outperformed those of Apple, Google or Amazon in 2010) (Buranyi, 2017), with important biases in what gets to be published and where.

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Figure 1. Dandelion's crested achenes are flying and waiting for impact. Credit photo: Hasan Almasi (Unsplash, 3 May 2018, Canon, EOS 7D).

As Cambridge University Press *Quantitative Plant Biology* reaches its 5th anniversary in 2025, it also got its first impact factor. As one can imagine from this preamble, we are welcoming this news with mixed feelings.

On the one hand, this is a recognition of the journal belonging to a larger scientific community and a measure of the citations across the scientific literature. *Quantitative Plant Biology*'s impact factor reached 2.5 in 2025, and we are thrilled to see such dynamics.

On the other hand, that number ignores what is important to us – that is, what one can find in the journal:

- New angles on noise (Bhalerao, 2024), on somatic mutations in trees (Iwasa et al., 2024), on intermittent stresses (Gama et al., 2025) or on light heterogeneity (Claydon et al., 2025);
- New resources to study plant morphogenesis – for example, for root posture (Yagi et al., 2024), for zygote growth (Kang et al., 2024), for leaf growth with a quantitative atlas (Tolleter et al., 2024), for sepal curvature with a morphospace (Battu et al., 2025), for stem shape with four-dimensional phenotyping (Yoshida et al., 2025), for gynoecium growth with time-lapse imaging (Wodniok, 2025) and with many deep-learning methods (Hong et al., 2025; Wanner et al., 2024);
- The strong emphasis on systems thinking – for example, regarding patterning and micromechanics (Jacobs et al., 2025), synthetic gene circuits (Khan & Lister, 2025), fruit growth (Chung et al., 2025) or hypoxia (Chen et al., 2025);
- A collection of review articles on ion homeostasis in plant cells (Dreyer et al., 2024; Contador-Álvarez et al., 2025), with independent focuses on silicon (Huang & Ma, 2024), phosphorus (Chiang et al., 2025), calcium (Brownlee & Wheeler, 2025), zinc (Krämer, 2025), potassium (Wegner et al., 2025), iron (Leskova et al., 2025), manganese (Meier et al., 2025) or chloride (Silva-Herrera et al., 2025);
- Post-normal scientific themes, such as tools to avoid human biases when analysing patterns (Galipot, 2025) and a call for participatory approaches (Correa et al., 2025);
- Societal applications from quantitative plant biology – for example, for the maple syrup industry (McNulty et al., 2025);
- Last but not least, the authors – many world experts in their fields – and their creativity, with tributes to seminal past articles (e.g., on Turing (Siero & Deinum, 2025)).

In addition to content, the impact factor also overlooks the essentials of the journal:

- a community-based editorial board,
- a not-for-profit publisher (Cambridge University Press) and partner institution (John Innes Centre),
- a rigorous reviewing process,
- strong ethics (fully open access, free waivers available and community).

In the end, rather than using data to provide a number (reductionist path), our journal is all about quantitative thinking – that is, just the opposite: how to use numbers in the data to provide new questions (systemic path). Thus, our goal is not to reduce biology to numbers, but rather to use numbers to expand our understanding of the complexity and richness of the plant world. As we celebrate the journal's anniversary, we would prefer to move away from impacting the reader with a factor, but instead call for a pact with our readers to broaden the exploration of the plant world and its many surprises.

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Competing interest. The author is also the editor-in-chief of *Quantitative Plant Biology*, which explains the editorial tone of this article.

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References

Battu, V., **Kiss, A.**, **Delgado-Vaquera, A.**, **Sénéchal, F.**, **Mollier, C.**, **Hartasánchez, D. A.**, **Boudaoud, A.**, & **Monéger, F.** (2025). A 3D morpho-space of sepal geometry reveals the importance of organ curvature. *Quantitative Plant Biology*, **6**, e9.

Bhalerao, R. P. (2024). Getting it right: Suppression and leveraging of noise in robust decision-making. *Quantitative Plant Biology*, **5**, e10.

Brownlee, C., & **Wheeler, G. L.** (2025). Cellular calcium homeostasis and regulation of its dynamic perturbation. *Quantitative Plant Biology*, **6**, e5.

Buranyi, S. (2017). Is the staggeringly profitable business of scientific publishing bad for science? *The Guardian*. Retrieved from https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science.

Chen, S., **De Boer, H. J.**, & **Ten Tusscher, K.** (2025). A minimal mechanistic model of plant responses to oxygen deficit during waterlogging. *Quantitative Plant Biology*, **6**, e22.

Chiang, C.-P., **Yayen, J.**, & **Chiou, T.-J.** (2025). Mobilization and recycling of intracellular phosphorus in response to availability. *Quantitative Plant Biology*, **6**, e3.

Chung, S. W., **Yun, K.**, & **Kim, S.-H.** (2025). An integrative process-based model of fruit growth as a function of carbon and water fluxes modulated by endogenous abscisic acid in blueberry fruit. *Quantitative Plant Biology*, **6**, e19.

Claydon, W., **Sutton, P.**, **Redmond, E. J.**, … **Ezer, D.** (2025). The impact of light heterogeneity in controlled environment agriculture on biomass of microgreens. *Quantitative Plant Biology*, **6**, e17.

Contador-Álvarez, L., **Rojas-Rocco, T.**, **Rodríguez-Gómez, T.**, … **Dreyer, I.** (2025). Dynamics of homeostats: The basis of electrical, chemical, hydraulic, pH and calcium signaling in plants. *Quantitative Plant Biology*, **6**, e8.

Correa, S., **Charreyre, M.-T.**, **Hamant, O.**, & **Thomas, M.** (2025). Why participatory plant research now? *Quantitative Plant Biology*, **6**, e4.

Dreyer, I., **Hernández-Rojas, N.**, **Bolua-Hernández, Y.**, … **Michard, E.** (2024). Homeostats: The hidden rulers of ion homeostasis in plants. *Quantitative Plant Biology*, **5**, e8.

Fang, F. C., **Steen, R. G.**, & **Casadevall, A.** (2012). Misconduct accounts for the majority of retracted scientific publications. *Proceedings of the National Academy of Sciences*, **109**(42), 17028–17033.

Galipot, P. (2025). Colour pattern studies: The SE (𠀋) method, a shape-centred approach to explore biodiversity and avoid aesthetic biases. *Quantitative Plant Biology*, **6**, e10.

Gama, G., **Martin, K. C.**, & **Drew, D. M.** (2025). Wood formation of drought-resistant *Eucalyptus cladocalyx* under cyclical drought treatment. *Quantitative Plant Biology*, **6**, e12.

Hong, K., **Zhou, Y.**, & **Han, H.** (2025). The pipelines of deep learning-based plant image processing. *Quantitative Plant Biology*, **6**, e23.

Huang, S., & **Ma, J. F.** (2024). Silicon transport and its "homeostasis" in rice. *Quantitative Plant Biology*, **5**, e15.

ISI. (1994). *The Clarivate impact factor, current contents print editions*. Retrieved from https://clarivate.com/academia-government/essays/impact-factor/?utm_medium=Referral&utm_source=en-wikipedia-org.

Iwasa, Y., **Tomimoto, S.**, & **Satake, A.** (2024). Genetic diversity within a tree and alternative indexes for different evolutionary effects. *Quantitative Plant Biology*, **5**, e11.

Jacobs, B., **Saltini, M.**, **Molenaar, J.**, **Filion, L.**, & **Deinum, E. E.** (2025). Microtubule flexibility, microtubule-based nucleation and ROP pattern co-alignment enhance protoxylem microtubule patterning. *Quantitative Plant Biology*, **6**, e2.

Kang, Z., **Nonoyama, T.**, **Ishimoto, Y.**, … **Tsugawa, S.** (2024). A viscoelastic–plastic deformation model of hemisphere-like tip growth in Arabidopsis zygotes. *Quantitative Plant Biology*, **5**, e13.

Khan, A., & **Lister, R.** (2025). Synthetic gene circuits in plants: Recent advances and challenges. *Quantitative Plant Biology*, **6**, e6.

Krämer, U. (2025). Changing paradigms for the micronutrient zinc, a known protein cofactor, as a signal relaying also cellular redox state. *Quantitative Plant Biology*, **6**, e7.

Laine, C., **Babski, D.**, **Bachelet, V. C.**, … **Zakhama, L.** (2025). Predatory journals — What can we do to protect their prey? *New England Journal of Medicine*, **392** (3), 283–285.

Leskova, A., **Xiong, T. C.**, **Mari, S.**, & **Curie, C.** (2025). Untangling iron threads: A deep dive into plant intracellular pools. *Quantitative Plant Biology*, **6**, e14.

McNulty, H. G., **Silvestro, R.**, **He, M.**, **Gennaretti, F.**, & **Rossi, S.** (2025). To flow or to grow? Impacts of tapping on sugar maple. *Quantitative Plant Biology*, **6**, e11.

Meier, B., **Mariani, O.**, & **Peiter, E.** (2025). Manganese handling in plants: Advances in the mechanistic and functional understanding of transport pathways. *Quantitative Plant Biology*, **6**, e16.

Owen, J. (2019). *Impact factors: Payment by results, research*. Retrieved from https://www.researchresearch.com/news/article/?articleId=1380712.

Park, M., **Leahey, E.**, & **Funk, R. J.** (2023). Papers and patents are becoming less disruptive over time. *Nature*, **613** (7942), 138–144.

Richardson, R. A. K., **Hong, S. S.**, **Byrne, J. A.**, **Stoeger, T.**, & **Amaral, L. A. N.** (2025). The entities enabling scientific fraud at scale are large, resilient, and growing rapidly. *Proceedings of the National Academy of Sciences*, **122** (32), e2420092122.

Siero, E., & **Deinum, E. E.** (2025). The Turing heritage for plant biology: All spots and stripes? *Quantitative Plant Biology*, **6**, e1.

Silva-Herrera, H., **Wege, S.**, **Franzisky, B. L.**, **Ahmad, N.**, **Roelfsema, M. R. G.**, & **Geilfus, C.-M.** (2025). Chloride transport and homeostasis in plants. *Quantitative Plant Biology*, **6**, e20.

Tolleter, D., **Smith, E. N.**, **Dupont-Thibert, C.**, … **Curien, G.** (2024). The Arabidopsis leaf quantitative atlas: A cellular and subcellular mapping through unified data integration. *Quantitative Plant Biology*, **5**, e2.

Wanner, J., **Kuhn Cuellar, L.**, **Rausch, L.**, … **Nahnsen, S.** (2024). Nf-root: A best-practice pipeline for deep-learning-based analysis of Apoplastic pH in microscopy images of developmental zones in plant root tissue. *Quantitative Plant Biology*, **5**, e12.

Wegner, L. H., **Pottosin, I.**, **Dreyer, I.**, & **Shabala, S.** (2025). Potassium homeostasis and signalling: From the whole plant to the subcellular level. *Quantitative Plant Biology*, **6**, e13.

Wodniok, W. (2025). Time-lapse confocal imaging helps to reveal a secret behind gynoecium development. *Quantitative Plant Biology*, **6**, e18.

Yagi, H., **Hara-Nishimura, I.**, & **Ueda, H.** (2024). Quantitative analysis of the root posture of *Arabidopsis thaliana* mutants with wavy roots. *Quantitative Plant Biology*, **5**, e9.

Yoshida, D., **Kunita, I.**, **Toda, M.**, **Ueda, H.**, & **Higaki, T.** (2025). Four-dimensional phenotyping reveals MYOSIN XI-dependent establishment of branch morphology through upward- and stably-directed growth in Arabidopsis. *Quantitative Plant Biology*, **6**, e15.

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