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Demonstrating a significant advance to the field: an essential criterion for publication in Functional Ecology

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Abstract

Demonstrating how a study advances the field is an essential criterion for publication in Functional Ecology. However, it is not always clear what constitutes a 'significant advance' and many manuscripts are rejected because authors have not demonstrated how their study will advance the field. In this editorial, we explain what the editors of Functional Ecology regard as an advance, and we provide some tips about how to demonstrate the advance in the manuscript text.

Introduction

We recently updated *Functional Ecology*'s aims and scope to emphasise that we seek to publish papers that "***significantly advance*** our mechanistic understanding of ecological pattern and process". Demonstrating how a study will advance the field is therefore an essential criterion for manuscripts being considered for publication in *Functional Ecology*. We recognize that for authors, particularly newer authors, it is often hard to pinpoint what constitutes a 'significant advance'. Furthermore, many authors (even very experienced ones) often forget to highlight the advance in the manuscript in a way that makes it clear to readers outside of the immediate field of study. Because *Functional Ecology* seeks to attract a very broad readership, and the editorial staff come from a diverse suite of academic backgrounds, making the advance clear to the broadest possible audience is not a trivial matter.

A bit of background

The peer-review process costs a lot of time for all involved – authors, reviewers, editors, and journal staff - so we all share a vested interest in ensuring that nobody's time is wasted. Senior editors are conscious of this time commitment when they make initial decisions about whether to send a manuscript to a handling associate editor, and our associate editors consider the reviewer burden before sending the manuscript out for review. To reduce the time burden for all involved, editors generally start the decision-making process based on just two criteria:

1) Whether the topic falls within the journal's aims and scope
2) Whether the paper will be read and cited by the journal's readership

These two criteria are essential. A paper can be well-written, scientifically robust, and present novel results, but if these two criteria aren't met, the editor will nonetheless reject the manuscript without sending it out to review.

Ensuring your paper meets the first criterion is reasonably straightforward. Read the aims and scope to check if your paper truly matches the focus the journal. At Functional Ecology, we are interested in function, so we want to publish ***papers that provide mechanistic or process-oriented insights into ecological phenomena***. We are unlikely to consider papers that are purely descriptive, strongly reliant on correlation, or which focus mostly on mechanisms, without broader ecological context. More generally, another way to decide if your paper fits a journal's aims and scope is to ask yourself whether your paper will reach the appropriate readership if it is published there: Who is likely to be interested in your paper? Would you check this journal if you were looking for a paper on the same topic?

The second criterion – whether a paper will be read and cited - is harder for both editors and authors to predict. However, a paper that advances understanding and motivates new studies is useful to other researchers and is therefore most likely to be widely read and cited. This is why we want to publish ***papers that will significantly advance the field***; we believe that such papers will be widely cited because they provide new and important insights, motivate new studies, or challenge existing views. Thus, we are unlikely to consider papers that are limited in scope to very specific regions or species. That is not to say that studies conducted on single species or constrained to a region are not publishable. Indeed, it would be challenging to undertake every study at a global level. However, what must be considered is how the work contributes to major ecological theories or concepts. Does the work *challenge* or *advance* our understanding of these concepts? Would scientists studying insects or birds look to your paper about fish for insights regarding ecological processes? We emphasise *advancing the field* rather than *novelty*, because editorial decisions based on novelty alone are problematic, not least because they require in-depth knowledge of the subject matter (Arnqvist 2013) but also because a novel finding can still be entirely irrelevant to our readers.

What is an advance to the field?

Of course, it is important to understand what a journal might consider an 'advance' to the field, and it is usually very closely linked to the journal's aims and scope. Confirmatory or incremental

research also advances science and therefore has merit (Arnqvist 2013), but such studies are not the focus of *Functional Ecology*. Incremental advances and confirmatory research are most likely to appeal to researchers working on very closely related topics or similar systems, and are therefore better suited to specialist journals (or the author-friendly *Ecology and Evolution*, to whom we refer many papers). At *Functional Ecology*, we are instead looking for works that represent a step-change in our understanding of ecological phenomena. Our aims and scope states that we publish research from across the globe and across a very broad range of ecological subdisciplines, so we want to publish papers that will appeal to a broad ecological readership. To *significantly advance* the field, papers in *Functional Ecology* should therefore provide new insights or understanding into ecological processes and mechanisms that are widely applicable or broadly relevant (e.g. across taxa, ecosystems, or geographical regions). A study can yield new insights or understanding by revealing an important knowledge gap, successfully challenging a paradigm, or providing mechanistic underpinnings for ecological patterns or processes. The single thing all these outcomes have in common is that they will motivate or facilitate new research – and this is what we mean by a *significant advance* to the field.

Demonstrating the advance to the field

Ideally, the desire to advance the field should be the justification for conducting the study in the first place, so the paper can be framed entirely around that advance. However, there are three key sections in the manuscript where it is paramount to show how the paper's findings represent an advance to the field: the abstract, the introduction, and the discussion (conclusions).

The abstract gives the editor and reviewers their first impression of the paper, so the advance needs to be clear. The potential for an advance can be indicated at the start of the abstract by outlining the importance or relevance of the issue the study will address. The abstract should end with a strong statement showing how the paper will advance the field by improving understanding or exposing important knowledge gaps. The 'Synthesis' section recommended by the British Ecological Society journals is the best place for this information.

The introduction should signal the potential of the study to advance the field by placing it in context. A good way to achieve this is to structure the introduction by 'funnelling' the

information from broad to specific (Denney & Tewksbury 2013; Sayer 2018), i.e. first presenting the broader relevance of the topic, then the scientific context, and finally the specific issues the study will address. The introduction should end with clear, well-justified research aims that demonstrate the potential for the study to advance the field. A final sentence stating what new understanding will be gained from meeting these aims is also an excellent way to underscore the potential advance.

The discussion should demonstrate throughout how the research contributes to new insights and understanding. However, a separate short conclusions section at the end of the discussion can be really useful for highlighting how the study might motivate or facilitate new research. It is important to note that the general statement 'further research is needed' is not a good way to conclude a paper, because it signals to the reader that the present study did not do enough. Any variation on this statement alerts the editor, in advance, that you already have concluded that the work is not a sufficiently large advance. Instead, a strong conclusions section highlights the achievements of the study and demonstrates specifically how the findings raise new questions that now need to be addressed. Identifying these new questions is not necessarily the same as noting the next steps for your particular line of inquiry (which might fall into the category of future work that is needed). These new questions take the field in new directions or open up new avenues of investigation. We realize, of course, that future work will always be needed, but the contributions highlighted in a paper need to stand on their own.

What do we not count as a 'significant advance'

We regularly see manuscripts promising novel results that we do not consider a sufficient advance to the field. As suggested previously, *Functional Ecology* seeks to publish papers that represent a step-change, rather than incremental or confirmatory research. Incremental research represents a minor advance but is less likely to lead to new studies. Confirmatory research corroborates previous studies but is unlikely to motivate new work.

We commonly see four types of manuscripts, that we do not feel represent a sufficiently substantial advance to merit publication in *Functional Ecology*:

1) The study largely replicates previously published work but i) in a different geographical region; ii) in a different ecosystem; or iii) focussing on a different species or community. Although such studies reveal similarities or differences between two systems, they are

usually considered incremental or confirmatory. For the findings to be considered a step-change in understanding, the paper would need to make a compelling case that replicating a previous study has provided important new insights.

2) The manuscript presents findings that are likely to be specific to an ecosystem, region, community, or taxon. There are certainly cases where site- or taxon-specific results have revealed important ecological insights, for example where model organisms or systems are used to propose general principles or to empirically test a new theory. However, the paper would need to make a persuasive case for the wider applicability, generality, or relevance of the results to be considered a significant advance to the field.
3) Most of the paper focusses on results that have been demonstrated in previously published papers, with just one or two new findings 'added on'. Unless the text can be framed around these new insights to make them the focus of the paper, the study is likely to be regarded as incremental and the advance therefore insufficiently large to be of interest to our readers.
4) The study reframes research questions around currently hot topics or popular terms, but nonetheless produces similar results to previously published works. A very good recent example of this in ecology is manuscripts in which multiple variables are collapsed into a single 'multifunctionality' metric, but the paper nevertheless comes to the same conclusions as published works that present the results for individual variables. Similarly, a study might use a novel technique but still come to the same conclusions as an older paper using 'outdated' methodology. Although these studies may be useful to ensure that previous findings are still relevant when more modern approaches are used, they are nonetheless confirmatory in nature.

All of these four types of manuscripts are usually motivated by, and built upon, important original work – it is precisely this important original work that we seek to publish in *Functional Ecology*.

There is a 5th sort of manuscript that we receive from time to time: these papers claim to present a new theory, which could represent the sort of tremendous advance we aspire to publish, but provide no supporting experimentation or data to support the theory. Such papers often provide a logical and rational argument for the theory, citing examples that are well-explained and appear to support the argument, but lack data or analyses. Without any robust tests of the proposed idea, these are almost philosophical in nature, but cannot be considered research papers. Thus, although they might someday represent more than an incremental advance, it is

impossible to determine their potential impact in their present form. These types of papers might be suited for one of our *Perspectives,* but the theory would still need to be robustly based on published empirical evidence.

Final words

Planning research that will advance the field occurs long before any manuscript preparation is required, whereas demonstrating the advance to the field in a paper relies very much on text structure, narrative, and language. At *Functional Ecology*, we already offer authors resources to help with these issues, including our guides to scientific writing (Sayer 2019) and review papers (Sayer 2018), and our free trial of Writefull for online language editing. This editorial adds to those resources by describing what we initially look for in a manuscript. However, we caution against hyperbole and exaggeration, as overpromising the significance of the advance will leave editors and reviewers disappointed and more likely to recommend rejection. We refer you to the excellent editorial by Schimel & Ritz (2020) for more guidance on '*How to avoid having your manuscript rejected*', as their advice can be applied to most scientific journals. It goes without saying that, for the paper to ultimately be accepted for publication, it must also have robust methods, and sound interpretation and conclusions (Schimel & Ritz 2020). However, demonstrating how the paper will advance the field should not only help get it over the first hurdle, but will also generate more interest in the paper once it has been published.

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