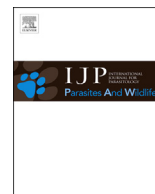


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Review

On the benefits of systematic reviews for wildlife parasitology

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ABSTRACT

Systematic reviews and meta-analyses are widely accepted as the best means to synthesise quantitative or qualitative scientific evidence. Many scientific fields have embraced these more rigorous review techniques as a means to bring together large and complex bodies of literature and their data. Unfortunately, due to perceived difficulties and unfamiliarity with processes, other fields are not using these options to review their literature. One way to provide guidance for a specific field is to examine critically recent reviews and meta-analyses and to explain the advantages and disadvantages of the various review techniques. In this paper, we examine review papers in the emerging field of wildlife parasitology and compare five different literature review types—configurative narrative review, aggregative scoping review, aggregative literature review, aggregative meta-analysis, and aggregative systematic review. We found that most literature reviews did not adequately explain the methodology used to find the literature under review. We also found that most literature reviews were not comprehensive nor did they critically appraise the literature under review. Such a lack severely reduces the reliability of the reviews. We encourage all authors to consider using systematic reviews in the future, and for authors and peer-reviewers to be aware of the limitations of non-systematic reviews.

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1. Introduction

Literature reviews provide vital means of synthesising large bodies of evidence, and their importance becomes clear considering the ever-increasing rate of research publication (Pautasso, 2012). In addition to acting as bibliographies of relevant research, reviews can estimate effect sizes of particular interventions or

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treatments (i.e. via meta-analysis), and can also examine the impact of context (i.e. heterogeneity) (Koricheva et al., 2013). Systematic reviews are a specific subset of literature reviews that aim to employ strict methods when searching for, screening, critically appraising and synthesising studies to maximise reliability through transparency, repeatability and objectivity (Higgins and Green, 2011). While systematic reviews can be resource-intensive, traditional literature reviews (clinical reviews and vote-counting reviews) can adopt systematic approaches to improve their reliability with minimal additional effort (Haddaway et al., 2015). Traditional reviews that do not adopt such approaches are susceptible to a number of limitations, including selection bias and publication bias that can reduce the reliability of the review outputs. All literature reviews (including systematic reviews) vary in their reliability, but systematic approaches can help to reduce susceptibility to a number of different biases.

Here, we outline the limitations associated with traditional literature reviews and what can be done to mitigate them using systematic review methodology. We illustrate our argument using recently published reviews in the wildlife-parasitology literature to provide examples of reviews that are at risk of unreliability and those that have succeeded in their stated aims. Wildlife parasitology is an ideal field to examine the variety of literature review approaches because it combines two disparate fields—ecology and parasitology. Ecologists have only recently abandoned the less formalised narrative review for systematic reviews and meta-analyses (Lortie, 2014), while parasitologists have a long tradition of following the Cochrane Collaboration methods of systematic reviews (Cook et al., 1997) because of the clinical nature of their work. Wildlife parasitology, with its roots both in ecology and veterinary medicine, has examples of all types of reviews in the recent literature and thus allows for a balanced examination of the pros and cons of each system.

2. Materials and methods

To identify review articles for this paper, we used systematic review methods to search for, screen and appraise reviews in the field of wildlife parasitology. We searched Web of Science Core Collections (Stockholm University subscription) on 18th April 2016 using the search string “wildlife AND parasit* AND (review OR “meta-analysis” OR metaanalysis)” in a Topic Words search. We

restricted our search to the period from 2010 to 2015 due to resource limitations. We also selected a suite of academic parasitology journals that publish wildlife articles (Trends in Parasitology, International Journal for Parasitology – Parasites and Wildlife (IJP-PAW), Parasites and Vector, and Parasites and Vectors), and hand-searched within these journals for review papers published during the same period. Each journal was searched using its own search engine using the keyword ‘wildlife’, then identifying those articles that were categorised as ‘reviews’. The obtained search results from database and hand searches were then screened using the following inclusion criteria: i) they were a literature review; 2) their focus was on wildlife parasitology. We defined literature reviews as those that synthesise a data set for the specific purpose of detecting a pattern or trend. We have categorised reviews using an adapted version of the system set out by O'Connor and Sargeant (2015), as follows: 1) configurative narrative integrative reviews; 2) aggregative scoping reviews; 3) aggregative full literature review; 4) aggregative meta-analysis; and 5) aggregative systematic review (see Table 1). We have used two additional categories to the original system proposed by O'Connor and Sargeant (2015): configurative and aggregative, according to (Gough et al., 2015), with configurative reviews being model-forming, whilst aggregative reviews aim to collate and summarise study findings. In addition, we described five domains relating to the reliability and quality of the reviews, as follows: transparency, comprehensiveness, presence of vote-counting analysis, presence of critical appraisal of included studies, and confusion of no evidence of effect with evidence of no effect. These domains are described in detail below.

2.1. A lack of transparency

When reviewers do not describe how they searched for evidence, nor how they screened studies for inclusion, the review is then neither truly repeatable nor verifiable, as all science should be. By detailing searching and screening strategies, including the search strings and databases used, (making use of supplementary information) the work can be verified, repeated or updated (e.g. Bernes et al., 2015). In the fields of social science, human medicine and environmental management, systematic reviews are typically published with coordinating organisations that set standards in systematic review methods (such as the Collaboration for

Table 1
Categories of review used for classifying literature reviews identified through this study.

Label	Description	Search	Inclusion	Appraisal	Synthesis	Analysis
Configurative narrative integrative review	Preliminary assessment of literature with the aim of introducing and interpreting an area of work	None identified	No details of inclusion/exclusion criteria	No or little quality assessment	Tabular with narrative commentary	Characterises literature by qualitative metric
Aggregative scoping review	Preliminary assessment of literature with the aim of identifying nature and extent of research	Some	No details of inclusion/exclusion criteria	No or little quality assessment	Tabular with narrative commentary	Characterises literature by some qualitative or quantitative metric often by vote-counting
Aggregative full literature review	Systematic search, appraisal and synthesis of research evidence to produce a best evidence synthesis	Exhaustive	No details of inclusion/exclusion criteria	Some quality assessment	Tabular with narrative commentary	Characterises literature by some qualitative or quantitative metric often by categories
Aggregative meta-analysis review	Systematic search with a statistical analytical component that combines the results to understand the effects	Exhaustive	No details of inclusion/exclusion criteria	Some quality assessment	Graphical, tabular, narrative commentary	Characterises literature by meta-analytical quantitative methods
Aggregative systematic review	Systematic search and inclusion stages with an assessment of study liability	Exhaustive, including grey literature	Full details of inclusion/exclusion criteria	All studies included appraised for quality	Graphical, tabular, narrative	Characterises literature by some qualitative or quantitative synthesis

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