

BIOL535 Review Paper Guidelines

The goal of the review paper is to:

- (1) Provide students an opportunity to delve deeply into one topic in Urbanization and Biodiversity, and
- (2) Encourage students to synthesize and critically evaluate ideas and evidence in an active area of research, and
- (3) Help students improve their skills in clear, concise written communication.

The review paper is worth 40% of your final mark in the course.

Write a short paper (no more than 10 pages, double spaced, not including figures and references) following the format of review papers in the journal *Trends in Ecology and Evolution* (available online through our library), reviewing the evidence relevant to the topic you lead presented in class. In some cases, students who have found other topics (not being cover by anyone else in the class) more interesting may write their review on that topic, with advance approval. The disadvantage of writing on a topic other than the one you present on is that you won't have received feedback on your critical evaluation and presentation of the topic.

Your review paper should parallel the structure of the class presentation, with one added section at the end:

Part 1. Background and Context (~2 pages)

In this component of the paper, introduce the broad concepts and background required for the reader to understand the rationale and foundation underlying the focal question. What did researchers know already that led to the focal question – think of this as the “Observations” stage of the scientific method. Make sure that you provide sufficient depth and background that the next components make sense, and so that the gap in knowledge addressed by your focal study is clear.

Part 2. The Focal Question (~1 page)

Here, introduce the focal question and all plausible alternative hypotheses to answer the question (even those that authors of the papers you've read have neglected). Mapping out broad predictions here could be useful as well.

Part 3. Review of Evidence (~4-5 pages)

What evidence do we have to evaluate the hypotheses and predictions outlined in part 2? Provide sufficient explanation of how studies were conducted so that the evidence can be critically evaluated. What conclusions can we draw from a synthesis across all of this evidence? Do we now have an answer to the focal question? Can we reject any of the hypothesis?

Part 4. Unanswered Questions / Future Directions (~1/2 page)

What work remains to be done? What future research would be most productive in advancing the field. Be creative here – how would you apply the scientific method to gather important evidence to fill gaps in knowledge?

Part 5. Broad Conclusions (~1/4 page)

Write one concise paragraph that draws broad conclusions based on the evidence that you have reviewed in the paper. End with a take home message of how the work you have reviewed answers the focal question (or fails to) and how it has advanced knowledge in this field.

References Section

Follow the same referencing format as is used in *Trends in Ecology and Evolution* and list all references that are cited in the text of your review. There is no maximum number of references, but students must cite a minimum of five **primary** research papers, and will likely need to cite several others. Secondary and tertiary papers are fine to cite as well, but cannot be used to meet the 5 paper minimum. **ALL STATEMENTS OF FACTS THAT ARE NOT COMMON KNOWLEDGE REQUIRE A CITATION.** Cite sources within each sentence that includes a statement that needs a citation – do not gather up citations at the end of paragraphs. This might mean you repeatedly cite the same study for multiple sentences in a row – that’s ok.

The entirety of the paper must be written in the students’ own words. Any evidence of plagiarism of any portion of the paper will result in a final mark of zero on the assignment, at a minimum.

Final papers are due Friday, 8 April 2022 (by 10pm).

Send your final paper to bonierf@queensu.ca in pdf format. Students that encounter difficulty in meeting the deadline can use a 72-hour grace period (and submit the paper by 11 April 2022 at 10pm), but no further extensions will be permitted, without documentation of a longer-term extenuating circumstance through the Academic Considerations office. As such, students should not use the grace period as a default extension, because if they encounter obstacles to completing their work during that time, additional extensions will generally not be available. This 72-hour grace period makes this assignment “accommodations-inclusive” in that it provides due date flexibility for students with special accommodations.

Review Paper Rubric

TOTAL: / 28 points

1. Clarity. (4 points) Does your paper clearly and succinctly explain your topic and the relevant predictions, evidence, and ideas? If you included figures, do they improve clarity of the content and convey relevant information?

2. Depth & Balance. (4 points) Does the review adequately cover the important information relevant to your topic? Did you review relevant published evidence in sufficient depth to illustrate the current state of knowledge?

3. Synthesis. (4 points) Does your paper synthesize relevant evidence into a coherent review? [Avoid listing papers and findings like a 'laundry list' review. Focus on synthesizing content across multiple studies into a clear overview of the topic.]

4. Critical Thinking. (4 points) Does your assessment of evidence illustrate critical thinking? (i.e., Do you provide a fair and logic-based critique of ideas and evidence? Do you identify key areas of research that would help to further advance the field?)

5. Organization. (4 points) How well does your paper flow? Does it progress logically from one idea to the next? Is it focused (i.e., does it stay on topic)?

6. Overall Presentation. (4 points) Is your paper readable? Is the writing plain and direct, with proper spelling and grammar? Is your referencing complete and consistent (i.e., do references match the sources, is full citation information provided for each)?

[see Tips for Effective Writing below; you will lose marks on this criterion if you ignore these tips]

7. References. (4 points) Are your references appropriate for your paper, and do they meet or exceed minimum expectations and reflect adequate research into the topic? Is the content in your review adequately supported by citations?

Tips for Effective Writing

The advice presented here comes from a variety of sources – some from Strunk & White's *Elements of Style* (a book all writers ought to read), and some from PR Martin & F Bonier who gathered it from experience, guidance from our mentors, and through trial and error.

As biologists, we want to avoid weak thinking, weak science, and weak writing - one often leads to the other.

- "Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all sentences short or avoid all detail and treat subjects only in outline, **but that every word tell.**"

- W. Strunk Jr. & E.B. White, *Elements of Style*

- **Use the active voice.** E.g., NO: "The wings of warblers were measured ..." YES: "We measured the wings of warblers ..."

- Make sure sections of your paper correspond. (e.g., clearly list predictions in a particular order in the introduction, and keep the same order throughout).

- Avoid tangents. Stay focused!

- Make the paragraph the unit of composition. The opening sentence indicates by its subject the direction the paragraph is to take. Your readers should be able to understand your paper (in a coarse way) by reading only the topic sentence of each paragraph.

- Map out your paragraphs BEFORE you start writing. E.g., start with an outline of topic sentences, possibly with point form ideas to include in each paragraph.

- Make sure that every sentence within the paragraph pertains to your topic sentence of the paragraph. If they don't, you either need more than one paragraph or a different topic sentence.

- Use definite, specific, concrete language. E.g., NO: "A period of unfavourable weather set in." YES: "It rained every day for a week."

- Omit needless words. E.g., NO: "The reason why robin's eggs are blue is that ..." YES: "Robin's eggs are blue because ..." NO: "Tree Swallows are known to migrate." YES: "Tree Swallows migrate." NO: "It has long been known that urban birds are often ecological generalists." YES: "Urban birds are often ecological generalists."

- Avoid jargon. For e.g., NO: "The trophic niche of the Short-eared Owl." YES: "Food of the Short-eared Owl" or "What Short-eared Owls eat."

- Express coordinate ideas in similar form. E.g., NO: "Formerly, science was taught by the textbook method, while now the laboratory method is employed." YES: "Formerly, science was taught by the textbook method; now it is taught by the laboratory method."
- Avoid pronouns as subjects. E.g., NO: "It is known that Tree Swallows migrate." YES: "Tree Swallows migrate." NO: "Tree Swallows migrate to warmer climates in winter. This is important because ..." YES: "Tree Swallows migrate to warmer climates in winter. Migrating south is important because ..."
- Make the biology the subject of most of your sentences, not the biologists. NO: "Smith et al. (1999) showed evidence for beetles burying carcasses. In another study, Johnson et al. (2012) found evidence for beetles feeding on eggs." YES: "Beetles bury carcasses (Smith et al. 1999) and feed on eggs (Johnson et al. 2012)."