Guide for students writing their thesis in the Faculty of Biology at Adam Mickiewicz University

Master's thesis

Rafał Bernard

Laboratorium Dydaktyki i Ochrony Przyrody, Wydział Biologii Uniwersytetu im. Adama Mickiewicza w Poznaniu, rbernard@amu.edu.pl

Translated by Robert Pagett, *Native English*, in cooperation with the author

This *Guide* does not pretend to be a universal compendium, although it does contain many commonly used elements. It has been prepared primarily with students from the Faculty of Biology at Adam Mickiewicz University in mind, therefore it takes the specific nature of biological and related sciences into account, as well as local experiences, findings and good practices.

The *Guide* is decidedly practical and utilitarian in nature. This approach results in a somewhat conventional presentation of the content, which is largely organised in bullet points, but allows for repetition and uses concise, precise wording. Priority is given here to clarity, ease of comprehension, and application.

Some of the elements concerning the thesis are requirements, and these are formulated explicitly. However, many aspects and elements are not fully standardised, i.e. they can be shaped in different ways; [for example, the elements given in square brackets are optional elements and names]. The solutions given for these aspects are therefore suggestions or recommendations, and a given supervisor will adopt a particular form as he or she sees fit. In each case, it is up to the author and the thesis supervisor to determine the shape and details of the thesis, and this *Guide* is primarily a point of reference and educational aid.

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There is no doubt that the *Guide* can still be added to or improved. I would therefore be grateful for any comments that would improve its quality and usefulness.

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Requirements and introductory information and some technical elements

1. Form of the thesis

   The electronic form is the predominant form of thesis. In this form, the thesis will be uploaded to the Archive of Diploma Theses (APD).

2. Should the thesis be printed?

   Currently, there is no longer any requirement to print the thesis either for the archives or for the thesis supervisor or reviewer. Whether or not to print a copy of the thesis for the supervisor or reviewer depends solely on the arrangements between those performing these functions and the thesis author.

3. Declaration of sole authorship of the thesis

   The standardised declaration is confirmed by the thesis writer in the APD system and is not attached to the thesis (it is not part of it).

4. Total size of the thesis

   There are no requirements in this respect. The number of pages is not an indicator of the quality of the thesis – it depends on factors such the type of thesis and the specificity of the issues dealt with, among other things. In our Faculty, for example, a 35-page biotechnology thesis was assessed as ‘very good’, while some excellent conceptual papers (in the field of didactics) totalled 130–140 pages. The most common size is several dozen pages.

5. Page numbering – how to count pages

   According to the printing convention, we count all the pages of a work starting with the title page (if any are unprinted, they are also counted). In the past, some authors counted only printed pages, which was due to one-sided printing. However, nowadays it is definitely better to follow the "count all" rule.

6. Page numbering – inserting numbers

   Insert the page number at the bottom of the page in the middle [the outer margin is also possible].

   Page numbers are inserted only from the Introduction (from its first page), which always starts on an odd-numbered page; in the proposal presented here, this would be page 5 or 7, depending on the number of pages taken up by the preceding elements of the thesis (see

section 16). Thus, we do not number the title page, the acknowledgements page, the table of contents page and any pages listing the abbreviations used, the abstract and keywords.

7. Font, spacing, margins, text alignment

There are no formal requirements for font type and size, spacing or margins, or text alignment. However, the following recommendations can be made:

- font type: Times New Roman,
- font size: 12 pt,
- standard spacing: 1.5 lines,
- left margin: 3.5 cm, right margin: 2 cm,
- text aligned on both sides.

However, whatever rules the author or supervisor chooses for these elements, it is important that they are uniform throughout the thesis.

8. Page headers (= running head)

This is a 'header' line above a column of text. It is not generally used in dissertations, although nobody forbids it. If someone particularly likes this form, they can use it in the following layout:

Name initial. Surname, *first words of title or abbreviation of title*

9. Use of bold, italics, underlining

- Bold typeface is used:
  - in principle, only on the title page and in the titles of chapters and subchapters;
  - alternatively, it may also be used in the table header, if this improves clarity and understanding.
- In biology papers, italics are used mainly for the Latin names of taxa: sections, genus and species, e.g. *Ceriagrion mourae, C. mourae*. It is also possible (depending on the author/supervisor's decision) to use them:
  - in Latin words or abbreviations used in the text, e.g. *et al., c., per se, sensu stricto, in situ, in vitro*;
  - in verbatim quotations of whole phrases or sentences from a particular author, if we want to show that this is exactly how something was written and the meaning of a particular statement;
  - in the References [Bibliography] – for book titles and journal titles.
- Underlining is generally avoided.

10. Use of numbering and bullet points

Thesis authors often underestimate the use of numbering and bullet points. As a result, these theses contain large, compact blocks of text and long, often complex sentences or numbering

enclosed within the text block. Of course, the English language offers such possibilities, and these are correct. However, this form of text is definitely more suited to the humanities, where words are key and are a value in themselves. By contrast, in the natural sciences and related sciences, a text framed in this way may lack clarity and might consequently be less readable. For this reason, it is advisable to pay particular attention to the clarity of the text. One way to achieve this is through the use of numbering and bullet points. In no way does this mean that the language used of the thesis is of poorer quality. A thesis can be both beautifully written and skilful in its use of appropriate spacing, numbering and other forms used to 'loosen up' the text, thereby adding clarity.

11. Use of footnotes

    In theses in the biological and related sciences, we generally do not use footnotes (unlike in the humanities).

12. Numbering of chapters

    Numbering from the Introduction onwards is suggested (although some supervisors do not treat the Introduction as a 'real' chapter, in which case the number 1 is then given to the next chapter). On the other hand, the References [Bibliography], all the Lists of items and Appendices are no longer numbered chapters.

    The best solution for dividing chapters into subchapters and numbering them is to number them in the order:

    1.
    1.1., 1.2. etc. (subchapters)
    1.1.1., 1.1.2., etc. (further subsections, if required).

13. Where do we start the chapters?

    - We start each of the main chapters of the thesis (Introduction and subsequent chapters, as well as the References [Bibliography], Lists of Tables and Figures and Appendices) on a new page. This ensures that the thesis is as clear as possible.
    - Subsections, on the other hand, usually do not start on a new page, i.e. they start on a different level of the page. However, they should be clearly visible by means of a larger space between them and the preceding text, as well as a bold title font. However, sometimes we want to make the next subsection more distinct after a long section preceding it, in which case we can start it from a new page.
    - As the thesis is revised, the text is constantly shifting. We would therefore have to monitor continuously whether the beginning of a section has moved to the preceding or following page. From a practical point of view, it is best to ensure that the chapter starts automatically at the top of a new page. To do this: a) place the cursor at the end of the text preceding the new chapter, b) select the "Insert" tab, c) and then the "Page break" option. Of course, page breaks can be deleted if necessary.

14. Paragraphs

To improve the clarity of the text, it should be divided into sections called paragraphs. A paragraph starts on a new line and provides particular content – it discusses a specific aspect or element (though usually not very large). For example, in one paragraph, we consider which region was the refugium of the species during the glacial period and why; in the next paragraph, by what routes the post-glacial expansion of the species took place; in the next paragraph, when the species colonised the area of the country, and whether it colonised the whole country at once; and in yet another paragraph, whether the picture of its range in the country was subject to changes depending on the phase of the post-glacial period. Thus, we can say that a text divided into paragraphs is a text divided into certain thoughts arranged in a logical order.

A paragraph might vary in length but is most often neither a single sentence nor a page-long block of text. However, very short paragraphs do occur.

A paragraph can be distinguished in two ways:

- by starting its first line with a paragraph indent; this indentation should be the same in all paragraphs of the thesis (the word processor will ensure this automatically in line with our choice);
- by using paragraph spacing, which is effectively a blank line between two paragraphs (without indenting the first line); a good example of this use of a paragraph is the point within which we find ourselves.

A higher level of text sophistication is a defined paragraph structure. This is not a simple or explicit thing, nor is it required, but it is worth at least trying in places. A ‘topic sentence’ is essential here, which, like an introduction, opens the paragraph or at least is near the beginning. A topic sentence summarises (some say "relates") the content of the paragraph, e.g. "The data collected so far suggest that the post-glacial expansion of the species took two paths on two sides of the Carpathian arc". Subsequent sentences elaborate on this, for example, by showing what data support this statement and what relief-dependent routes the expansion may have taken. The ending of a paragraph, on the other hand, may be different: it can finalise a thought, close it or leave it open, or it can provide a transition/lead into the next paragraph. For example, it may point to the puzzling and still unresolved question of why the sites of a species are not found in a certain region along the expansion route, or it may indicate where the expansion reached (the next paragraph will deal with the supposed time of colonisation of this furthest region).

15. Dashes and hyphens

This guide is not a textbook on punctuation or drafting. There is, however, one element – the dash – that is very often misused, which might impede understanding and irritate some elegance-conscious supervisors. For this reason, I have provided a brief overview of its use.

- The shortest line, often and repeatedly misused, is a hyphen (not a dash!). It should only be used when compounding two words – independent features (e.g. yellow-blue) or two-part names (Poznań-Nowe Miasto) and surnames. It has also been used in ranges of numbers, such as the pages of publications in the Bibliography, e.g. 77-80. But even in this function, it has recently been increasingly replaced by the en dash. A hyphen is never separated from words by a space. It corresponds to the key near the number "0" at the top of the keyboard.

- Much more frequently, we should use the en dash – a line longer than the hyphen (used in this sentence). Use it between words and separate them on both sides with a space (Word automatically converts the hyphen to the en dash if you put a space on both sides). It is also used to separate interjections in a sentence. It has been used for these functions several times in this guide. Recently, it has also been used more and more frequently in number ranges, e.g. publication pages in the References [Bibliography] section, but then no space is added: 77–80. We can insert the en dash ourselves by selecting the key combination Ctrl and num –. So use the en dash as often as possible!

First pages of the thesis

16. Distribution of elements on the first pages of the thesis

    - first page (odd page) – title page;
    - second page (on the back of the title page) – acknowledgements;
    - third page – table of contents; in some theses, especially experimental ones, the table of contents is very extensive and also takes up the fourth page;
    - another page – the fourth (or fifth, if the table of contents is longer) – an optional element: a list of the abbreviations used;
        - in experimental papers, the table of contents is often followed by a list of the abbreviations used in the paper along with explanatory notes;
        - in other papers, an explanation of the abbreviations used is provided in the "Material and methods" section;
    - the next page – the fourth, fifth or sixth page, depending on the version of the previous pages adopted – an optional element: summary and keywords;
    - the next odd page – "Introduction", etc.; the "Introduction" always starts (as in a book) with the first odd-numbered page after the preceding elements; depending on the adopted content of these preceding pages (longer or shorter table of contents, list of abbreviations or without it, summary and keywords or without them), it may be the fifth or seventh page.

17. Title page

    The title page is standardised, the template available on the Faculty website. The only aspect we may shift is the distribution of the words, e.g. in the title: we try to make it logical but also aesthetically pleasing, i.e. that the words forming a phrase are on one line, as far as this is possible.

18. Acknowledgements, i.e. second printed page

    The supervisor does not expect acknowledgements. However, it is good manners to write such thanks in the paper, to the supervisor and possibly to another person whose significant help we have benefited from. We formulate the acknowledgements in such a way that sometimes they do not imply that this person did something for(instead of) us. After all, the master's thesis is supposed to be the student's own work and not that of a third party.

    We place the acknowledgement on a separate page, the second printed page (on the back of the title page). The acknowledgements are usually placed on the lower right-hand side of the page.

19. Table of contents, i.e. third (or third and fourth) printed page

    - Ideally, this should be generated automatically, with the appropriate function of the editor. This will be aesthetically pleasing and functional – it will change almost automatically if changes are made while the paper is being written.
    - If preparing the index 'manually', care must be taken to ensure that page numbers are aligned, and it is best to insert full stops between the end of the chapter title and the page number.

20. List of abbreviations

    In experimental papers with a larger number of abbreviations (more than three), it is customary to include a separate list of abbreviations (in other papers, the abbreviations used are explained in the chapter "Material and methods").

    This list should include abbreviations appearing more than once in the thesis. If an abbreviation functions as a name and appears only once in the text, we provide the full form of the abbreviation directly in the text. If an abbreviation appears more than once in the text, we provide the expanded abbreviation the first time it appears in the text and also include it in the list of abbreviations.

    We do not include the following in this list:
    - common abbreviations (DNA, RNA, ATP, etc.),
    - chemical symbols and formulas (NaCl, H_2O),
    - abbreviations of physical units (g, min),
    - abbreviations appearing in figures or tables (these should be included and explained in the figure or table descriptions).

21. Abstract and Keywords

    The Abstract and Keywords are loaded as separate elements into the Archive of Diploma Theses (APD). However, many people also include these elements in the main thesis file, since they are part of the thesis, as in publications. This practice, though optional, is recommended.

    The Abstract and Keywords can be placed on the next page(s) after the Table of Contents (or List of Abbreviations, if present) and before the Introduction.

    The abstract in a thesis is short and concise rather than long and elaborate. It is usually 100–300 words in length.

    The abstract is structured in a similar way to the thesis. It starts with a very brief outline of the background, i.e. it shows why the research was undertaken (purpose/subject of the research). It is equally brief in outlining how the research was conducted (methods). This is followed by the essential parts of the abstract – the main results of the research and the conclusions. The abstract should be very specific, (not descriptive) and focused on your own research and achievements.

Keywords are one- or two-word buzzwords, the 'keys' to the paper, as it were. A keyword may be, for example, the name of a taxon (e.g. *Arabidopsis thaliana*), a geographical name (e.g. Poland, Afrotropics), a field/department/ branch of research (e.g. hydrobiology, genomics, taxonomy, biotechnology, ecotoxicology), an aspect/association/process studied, etc. (e.g. habitat selectivity, biodiversity, bioindicator, climate change, DNA barcoding, COI, miRNA, GMOs, phosphorylation, bioremediation, transgenic plants).

The number of keywords is usually between 4–7.

Keywords are the terms by which a paper can be found in the databases. However, searches are often conducted by using both the title of the paper and the keywords. For this reason, it is considered best not to repeat words already in the title in Keywords. Instead, they can be replaced by an equivalent word (e.g. dragonflies in the title – Odonata in Keywords) or a word similar in meaning.

Type of master’s thesis

22. Research thesis

On the English-language courses in the Faculty of Biology at AMU, one type of master's thesis is permitted, i.e. a research thesis.

However, the broad term "research thesis" includes various works:

- experimental (including a field experiment),
- analytical,
- field – focused on biodiversity, natural inventories, assessment of the conservation status of a taxon, habitat or other natural feature, elements of the biology or ecology of a species in the light of environmental change and conservation policy,
- methodological – focusing on research methods or methods for and means of protecting nature and the environment.

There may therefore be some structural differences within the framework of research theses due to their specific nature.

Details of the differences in work plans and the framing of the main chapters according to the type of work are presented in paragraphs 23–24 and 25–30.

Examples of different general thesis plans

The following are thesis plans in general outline only (please refer to paragraphs 25–30 for more detailed information on the individual chapters of the thesis). The approaches to the thesis may vary depending on the type of thesis, as well as the author's conception of the thesis and the supervisor's preferences [the elements given in square brackets are optional elements and names].

23. Research paper (version I)

- Introduction
  - A substantive introduction.
  - Includes the aims of the paper and the research hypotheses or research questions.

- Material and methods
  - This chapter can be divided into shorter subsections, e.g. Description of sites (or briefly Sites), Methods of material collection (or Material collection), Characteristics of material (or Material), Methods of material analysis (or Material analysis), Statistical analyses, etc.

- Results
  - The “Results” chapter can be broken down into subsections containing different aspects of the findings obtained.

- Discussion [Analysis of results and discussion]
  - This chapter may only be called “Discussion” (this is the case in publications), or it may have a two-part name.
  - This chapter may also be divided into subsections containing different aspects of the results discussed.

- Conclusions [Summary and conclusions]

- References [Bibliography]
  For detailed information on this part of the paper, see paragraphs 31–33.

- List of tables

- List of figures [photographs, graphs]

- Appendix or Appendices (if present in the thesis)

24. Research paper (version II)

Some research papers may be framed slightly differently. The differences (which are independent of each other – there may be one or all of them) concern:

a) a more widely treated substantive background, which is contained in an additional separate chapter, “Research Background”,

b) the possible distinction of a separate chapter for presenting the thesis objectives and research hypotheses/questions,
c) a possible shift in the analysis of results.

- Introduction
    - A brief introduction (a keynote).
    - This chapter may include the aims of the thesis and the research hypotheses/questions (alternatively, they are included in a separate chapter after the "Research Background").

- Research Background [Research Issues]
    - This chapter will occur if the "Introduction" is a short keynote only.
    - It may have different names, but in each case, it contains a reasonably comprehensive research background for the issues dealt with in the thesis based on the literature.
    - It may contain several thematic subsections.

- [Aims of the work and research hypotheses/questions]
    - If not included in the "Introduction", these should be included in a separate chapter.

- Material and methods
    - This chapter can be divided into shorter subsections, e.g. Description of sites (or briefly Sites), Methods of material collection (or Material collection), Characteristics of material (or Material), Methods of material analysis (or Material analysis), Statistical analyses, etc.

- Results [and their analysis]
    - As a general rule, we use the "Results" version, and less frequently, where appropriate, the "Results and their analysis" version (see chapter characteristics).
    - If necessary, the "Results" section can be broken down into subsections covering different aspects of the results obtained.

- Discussion [Analysis of results and discussion]
    - This chapter may only be called "Discussion" (this is the case in publications), or it may have a two-part name.
    - Again, this chapter may be divided into subsections containing different aspects of the results discussed.

- Conclusions [Summary and conclusions]

- References [Bibliography]
  For detailed information on this part of the paper, see paragraphs 31–33.

- List of tables

- List of figures [photographs, graphs]

- Appendix or Appendices (if present in the thesis)

Main parts (chapters) of the thesis

The specifics of the main chapters themselves are discussed here, while the issues of the presence or absence of certain chapters and their layout are included in the sample thesis plans in points 23–24.

25. Introduction

This is an introduction to the thesis. It may contain general contents that is slightly broader in content than the topic of the thesis. This may refer, for example, to:

- the organism, chemical compound, process, phenomenon, aspect, properties, hazards, etc.;
- how relevant certain issues, and the problems being studied are to knowledge about..., the importance of using certain methods, using particular means, using certain skills, etc.;
- how interest in a particular research problem evolved;
- the state of knowledge of a given research problem, what has been found so far, what questions have been answered, and what is still unexplored or poorly/insufficiently researched;
- what methodological and material resources have been developed to date, how developed and widespread is the use of certain skills, and what has so far received too little attention, and has perhaps been underestimated, etc.

In research papers, there is often a broader version of the “Introduction”. It contains a more extensive expose of the substantive basis (factual background) of the thesis, which is gradually reduced to a statement of the aim of the work and the formulation of hypotheses or research questions. In some research papers, however, the “Introduction” is shorter and the broad exposition of the factual background is included in a separate chapter, e.g. “Research Background” (see below).

Against the above background, the author of the paper shows why he or she undertook the task in question, and what he or she is aiming at, i.e., he or she states the purpose of the paper (or aims). If it is a research paper, he or she formulates the hypothesis(es) or research questions in doing so.

Purpose of the thesis and research hypothesis/questions

In research papers:

- hypotheses are not present in all papers; some papers simply formulate research questions;
- the aim of the thesis and research hypotheses/questions may be stated towards the end or at the end of the “Introduction”;
- if we use a shorter "Introduction", followed by a separate chapter "Research background", then the objectives of the thesis and the hypotheses/research questions may be included in a separate chapter ("Aim of the thesis and research hypothesis", "Aim of the thesis and research questions") after the “Research background” and before the “Material and methods”. We do not include the aims or research hypotheses/questions in the chapter “Material and methods”, as they are not methods.

It is not advisable to add too many objectives: it is best if the thesis has one main objective or two related ones. If need be, the sole main objective of the thesis can be developed by additionally stating specific objectives.

The objective must be clearly formulated so that an assessment can be made of whether it has been achieved or not. The choice of words used to state the aims is also important. For example, the objective is not to analyse a situation or material, as analysis is a means to an end. The goal might be, for example, to identify something, to diagnose something, to define something, to solve a problem, to answer a question, to evaluate (e.g. a variation, impact or condition), to develop a critical characterisation of a certain problem/aspect, to develop a concept, etc. (these are just a few examples).

As with objectives, there should not be too many research hypotheses. Ideally, there should be one clear one or two research hypotheses.

Hypotheses and research questions should be specific and precisely formulated. What is very important is that the hypothesis should be falsifiable.

26. Research background [Research issues]

This chapter may appear in some research papers.

It contains an extensive general information about the topic/issues in the paper, based on the literature.

In journal publications, such a chapter does not occur; there is simply no space for one, nor is there any such need; its role – in brief content – is taken over by the chapter “'Introduction”. However, in dissertations, where it is very important to practise the skills of literature analysis, searching for and synthesising information, such a chapter (after a short "Introduction") is in some cases justified.

There may be a single “Research background” chapter (further subdivided into thematic subchapters) or, as an equivalent, there are several thematic chapters, each under its own title and related to the content.

Example of the division of a chapter into subchapters discussing particular aspects of a topic:

- in a (field) research paper discussing the impact of small hydroelectric power on the conservation status of the dragonfly fauna of the River Wełna, in addition to the “Introduction”, there is a chapter entitled "Research background", with three subchapters specified below (two of them further subdivided into lower-level subchapters):
    - Characteristics of the Wełna (Physiographic sketch, Biotic and abiotic characteristics of the watercourse),
    - Dragonflies associated with flowing waters,
    - Small hydropower plants (Use of water energy, Hydropower in Poland and Greater Poland, Small hydropower plants on the watercourse in question).

27. Material and methods

In this chapter, we describe:

- the locations and characteristics of the field sites being studied;
- the study sample (its size, composition, characteristics, origin, selection criteria, etc.);
- the methods used to collect and analyse the material, e.g.:
    - experimental methods with the conditions and course of the experiment, the procedures and protocols used, description of culture conditions all indicated,
    - methods of fieldwork, indicating the procedures for selecting plots or study sites and collecting materials,
    - methods of working with collections/databases (providing their source), e.g. criteria for the selection of specimens/ traits, principles for measurements,
    - methods of analysis and interpretation of the results obtained/material collected, including statistical methods;
    - the exact course of the procedure, but in the case of standardised or established procedures/protocol, we generally refer to them (e.g. with appropriate citations from the literature or program) without going into further detail;
- an adopted way of understanding/presenting/coding something, e.g. we have adopted the terminology or nomenclature used by a particular author, a particular division of something after some author or according to our own conception (this own vision of categorisation/division criteria should be presented), a certain layout of presentation of results, certain interpretative guidelines, a certain set of used abbreviations with their explanation, a certain understanding of concepts, etc.;
- locations (e.g. scientific institutions) of research material collected, e.g. collections assembled in the field or databases for genetic sequences obtained.

"Material and methods" can be divided into shorter subsections, e.g. Description of sites (or briefly Sites), Methods of material collection (or Material collection), Characteristics of material (or Material), Methods of material analysis (or Material analysis), Statistical analyses, etc.

28. Results

This chapter contains the results of the author's own work, so it is important that these results are shown clearly and precisely enough and are not mixed up with the achievements of others.

In a research paper, the "Results" chapter only presents the "dry" results of the research itself: facts found, the results of analysis (including statistical analysis), data obtained, and figures. If there is a lot of primary data (informally speaking, "raw" data), it can be included in the appendix(ces) at the end of the paper. In such a case, extracts from the data and the results of their analysis (i.e. the effects of processing the raw data) already appear in the "Results" chapter. Tables and basic graphs are often used to present these results, while the written content here is concise and precise, simply naming and stating the facts.

Comparisons and basic interpretations are possible here insofar as they are made within the same structure – the author’s own material and results (e.g. determining species percentage

or species richness, also making comparison between species/samples/groups/classes under consideration, etc.). However, what they do not do (generally) is enter into the realm of justifying/explaining a given state of affairs. We definitely do not present our own results against the background of other already known data or results. Consequently, as a rule, the results are not discussed further in this chapter: care should be taken not to draw summary conclusions and not to use far-reaching evaluations or value-justification terms, e.g. that differences in species abundance reflected their different degree of habitat specialisation, that species richness was greater as a result of larger habitat diversity, that differences in a given parameter being evaluated are the result of differential interacting factors or differential human pressure, etc. Such a complex and synthesising valuation and interpretation already belongs to the next chapter, titled "Discussion" or "Analysis of results and discussion".

In some research, however, the specificity of the content or the method used means it is necessary to analyse the results on an ongoing basis, in the same chapter, in the form of a full interpretation. In this case, the raw figures/facts alone without interpreting them can result in an artificial breakdown of the content between separate, far-flung sections of the text in two chapters, the need to repeat many of the same formulations in the following chapter, and on top of all that, chaos, e.g. when analysing numerous elements step by step. Nevertheless, in this chapter, we still stay within the confines of our own results and do not refer to the literature on the subject, in order not to disrupt the eloquence of the 'author's own' chapter. Framed in this way, the chapter can be called "Results and their analysis".

29. Discussion [Analysis of results and discussion]

This chapter:

- can be given a one-word "Discussion" (this is the case in publications), or may have a two-part name "Analysis of results and discussion";
- contains:
    - a reference to the hypotheses (which were falsified or supported) and the research questions;
    - a key interpretation of the author's own results – evaluating, justifying, explaining, synthesising, showing what follows from them, what they add to the current state of knowledge, what effects they have, new questions, research problems;
    - and skilful linking of these results with the previous literature on the subject (with specific items from this literature), e.g. statements that the newly obtained results broaden the knowledge in the given subject (new data, approaches, visions, elements of the "puzzle" have appeared, previous findings are shown in a different light), confirm previous reports or contradict them, a research problem posed previously has been solved, etc. Conducting a good discussion with the achievements of other researchers is not easy and often requires years of practice; although it may not be the most important element in a master's thesis, it is worth making an effort to bring this about, at least to some extent, as our research and its results are never a "desert island" – something independent and unconnected; on the contrary, they are based on the achievements of our predecessors and exist only in a network of various substantive relations and links, together constituting a larger whole and scientific progress.

What is important in this chapter, as indeed in the work as a whole, is the logic of the argument – building successive elements on previous ones to produce a result.

It is also important that when recording specific discussion statements, there is no doubt as to who the author is. Since we are discussing various issues with literary sources, it may be the case that the reader is not able to distinguish where our opinions end and where those of authors from the literature begin. If there is a risk of mixing up authors, it is possible to use wording in the first person, e.g. 'the results of my research have shown that', 'in my opinion', 'I believe that'. Moreover, if the paper consistently avoids first-person formulations, descriptive forms that leave no doubt as to their authorship should be used, e.g. 'the research results presented in this paper indicate....', 'the new data obtained are consistent/unconfirming', etc.

30. Conclusions [Summary and conclusions]

The title "Conclusions" (also possible "Summary and Conclusions") is most suitable for research papers.

One should be aware that the reader of our work often starts reading the Conclusions/Summary section. It is therefore worth making an effort to:

- show our work, its purpose(s), organisational principles/progress in the shortest possible manner,
- first and foremost, present the most valuable results of the research in the light of their interpretation.

"Conclusions" should specifically refer to:

- the research hypotheses – report on whether these are falsified or supported;
- research questions – stating the answers, if these have been worked out.

It is definitely best to present these conclusions in bullet points containing only the most important information. The content of the bullet points should be short and precise, and longer sections of text from previous chapters should not be repeated here.

References [Bibliography]

31. What is the “References” [“Bibliography”] section?

    The title "References" (also possible "Bibliography") is most suitable for research papers. This section contains an index of the literature sources used and referred to in the text:
    - primarily published texts (in print and ones only published online),
    - texts as yet unpublished but already accepted for publication
    - unpublished master’s theses or reports, if necessary.

    In the thesis, unauthorised online sources, i.e. websites and extracts from them, are also included in the “References”. However, they can at a complementary element at most and never the primary element of the set of sources used.

32. Order of bibliography entries

    In the “References”, the order of entries is alphabetical (by the name of the first author, followed by the second author, etc.).

    In the case of several publications in which a particular author is listed first:
    - all single-author items are listed first, ranked by year;
    - then dual-author and multi-author, listed alphabetically (by consecutive author) and then, if there are two or more publications by the same set of authors, by year;
    - if there are two papers by a given author (or set of authors) from the same year, we add the letter "a" and "b" after the year (without a space).

    Example:

    Smith A. 1967a.
    Smith A. 1967b.
    Smith A. 1975.
    Smith A., Beck E. 1973.
    Smith A., Beck E. 1975.
    Smith A., Beck E., Henricks M. 1989.
    Smith A., Henricks M. 1969.
    Smith A., Henricks M., Torrence R. 1976.

33. Rules for bibliographic citation

    The rules for one and the same item in the “References” can vary greatly depending on the convention adopted. In the natural sciences, however, there is a specific order and presentation of bibliographic data elements, while tertiary differences mainly concern punctuation and form (full stops, commas, colons, brackets, italics, etc.). For a given thesis, it is necessary to adopt certain patterns of providing bibliographic data for different types of items (after agreeing this with the thesis supervisor), and then to stick consistently to these patterns.

It might happen that some sources are incorrectly cited in the thesis or publications. This applies to an author's chapters within a book/monograph. If:

- the book/monograph consists of chapters,
- each chapter has its own authors,
- and we use a particular chapter,

it is absolutely crucial to cite the chapter in question and its authors, not the entire book/monograph and its editors. This must be done even if that chapter is merely a study of a single species in a distribution atlas or red book. In doing so, the way in which bibliographic data are given for an author's chapter differs from the way in which data are given for the whole book (see attached examples).

The following are suggestions for providing bibliographic data for different types of publication in "References".

Publication in a journal (including online-only journals)

Surname Initial of first name. Year. Title of article. Title of journal in *italics* or plain type volume of the journal or year number[no spaces](issue number in parentheses): page range with an en dash or hyphen.

Examples:

Jarosiewicz P., Fazi S., Zalewski M., 2022. How to boost ecohydrological nature-based solutions in water quality management. Ecohydrology and Hydrobiology 22(2): 226–233.

Kumar S., Stecher G., Tamura K. 2016. MEGA7: Molecular Evolutionary Genetics Analysis Version 7.0 for bigger datasets. *Molecular Biology and Evolution* 33: 1870–1874.

In an online-only journal, a unique article number is given instead of the page range at the end.

Example:

Van Rossum F., Hardy O.J. 2022. Guidelines for genetic monitoring of translocated plant populations. Conservation Biology 36(1): e13670.

Book/monograph

Surname Initial of first name. Year. Title of book in *italics* or plain type. Name of publisher [as briefly as possible], place of publication [often identical with publisher's headquarters].

In the past, the total number of pages of the book was still given at the end, e.g. 256 pp. However, this information is no longer compulsory and is often not provided in publications.

Examples:

Clark D.P., Pazdernik N.J., 2009. Biotechnology: applying the genetic revolution. Elsevier Academic Press, Burlington, San Diego, London.

Filippelli G. 2022. *Climate change and life: The complex co-evolution of climate and life on Earth, and beyond*. Elsevier, Amsterdam.

A chapter in a book/monograph (also in conference proceedings)

Surname Initial of first name. Year. Title of chapter in plain print. [in:] < this preposition with a colon may be without square brackets Last name Initial of first name. (ed. or eds), Title of book in *italics* or plain, Name of publisher, place of publication: the page range of the chapter in question with an en dash in the middle.

Examples:

Eissenstat D.M., Yanai R.D. 2002. Root life span, efficiency, and turnover. [in:] Weisel Y., Eshel A., Kafkafi U. (eds), *Plant roots: the hidden half*. Marcel Dekker, Inc., New York: 221–238.

Schroeder G., Łęska B., Fabrowska J., Messyasz B., Pikosz M. 2015. Analysis of green algae extracts. [in:] Kim S.-K., Chojnacka K. (eds), Marine algae extracts: processes, products, and applications. Wiley-VCH, Weinheim: 81–99.

The scope of the parties may also be expressed differently and stated elsewhere:
Surname Initial of first name. Year. Title of chapter in plain print. [in:] < this preposition with a colon may be without square brackets Last Name Initial of first name. (ed.), Title of the book in *italics* or plain, pp. page range of the chapter in question with an en dash in the middle. Name of publisher, place of publication.

Example:

Gomez A., Lunt D.H. 2007. Refugia within refugia: patterns of phylogeographic concordance in the Iberian Peninsula. in: Weiss S., Ferrand N. (eds), Phylogeography of Southern European Refugia, pp. 155–188. Springer, Dordrecht.

Conference abstract

Surname Initial of first name. Year. Title of presentation/poster. [in:] < this preposition with a colon can be without square brackets Conference title and within it the conference sequence number and possibly the name of the organisation, the venue, the date range of the conference. Journal or Issue name e.g. Conference Proceedings or Abstracts: the page range for the abstract we are citing.

Not all conferences have unique titles; often there is only the number and a recurring name of the conference in question.

Examples:

Bennett N., Roth R. 2015. Towards more inclusive conservation: What is the role of the conservation social sciences. [in:] ICCB 2015, 27th International Congress for Conservation Biology, Montpellier, France, 2–6 August 2015. Abstract Book: 57.

Kamińska A., Rzepecki R. 2022. Loss of lamin in a muscle-specific manner affects development and morphology in *Drosophila melanogaster*. [in:] 8th EUROBIOTECH Congress, June 20–22, 2022, Kraków, Poland. Abstract volume: 56.

Official published document

This can take a variety of formats. The most commonly used documents are laws or regulations.

Full text of the document title. Journal of laws Item number(s) [in some documents also date and pages].

Example:

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal of the European Communities L 206, 22/07/1992: 0007–0050.

Published Internet sources (online only)

Published online sources can be authorised or unauthorised (e.g. published databases).

- Authorised
  Surname Initial of first name. Year. Title of publication. Title of web source. Internet address. Date of access.

  Example:

  Stephenson P.J., Soarimalala V., Goodman S. 2016. Limnogale mergulus. The IUCN Red List of Threatened Species 2016: e.T11979A97189690. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T11979A97189690.en. Access: 23.04.2019.

- Unauthorised (e.g. Database)
  Name of source Year of access. Internet address. Date of access.

  Example:

  GenBank 2020. https://www.ncbi.nlm.nih.gov/nuccore/?term=Ceriagrion+mourae. Access 23.02.2020.

Unpublished Internet sources

In publications, the “References” section generally does not include unpublished internet sources. In dissertations, unpublished and usually unnamed internet sources may form a certain part of the sources. It is worth noting here, however, that they must not make up the predominant part of the sources, but at most be supplementary.

These sources may be included in the “References” at the end of the index or inserted among the printed sources in alphabetical order.

Unpublished internet items are also listed alphabetically, according to the first relevant word in the internet address. We provide the web address in a basic version, which is sufficient to access the item (and not five lines long). We always include the date of access at the end.

Examples:

https:// https://prolocor.com/what-we-do/ Access: 13.04.2022.

https://www.greenpeace.org/international/story/57219/brazil-amazon-deforestation-2022-bolsonaro-lula/ Access: 03.12.2022.

Lists of tables and figures

34. The need for and content of lists of items

A “List of tables” and a “List of figures” are included in a thesis when there are a larger number of tables and figures (there is no point in creating an index for one or two tables).

As with any index of items, the purpose is to bring together an ordered picture of the tabular and illustrative material in one place. This helps the reader to get an idea of the size and scope of this material, as well as its location in the thesis.

Each table and figure in the list should have a link to a specific page of the thesis, preferably given during the last phase of preparing the thesis.

If numerous photographs are included in the thesis alongside the figures or graphs, they are sometimes distinguished as a separate illustrative category. In this case, separate lists of figures and photographs may be included.

Appendix/Appendices

35. What are appendices for?

Some theses have an appendix or more appendices at the end of the thesis.

These appendices contain, for example:

- abundant primary data (informally referred to as "raw" data), such as field observation data, tables with measurement results, full genetic sequences, responses to survey questions, etc.;
    - this kind of data does not necessarily have to (although it might) be included in the “Results” section; if we include it there, the effect could be overwhelming in volume, and be both difficult to read and extract meaning from;
    - in theses with such an accumulation of data, the reader would expect some extracts from the data or results of specific analyses rather than "raw" data in the "Results" chapter;
    - at the same time, these basic data illustrate particular situations or cases and reflect the author's contribution – for these reasons, they should be included in the paper; including them in an appendix is the most beneficial option in such a situation;
- full-size maps showing, for example, the distribution of sites of the species or the distribution of plant communities at an appropriate scale.

If there is more than one appendix, they are numbered in Arabic numerals, e.g. Appendix 1, Appendix 2, etc.

In-text references (citations) to the subject literature

References in the text to previously known research results, concepts, opinions etc.

36. In your own words or verbatim?

    When we want to refer to someone's opinions, findings, data, etc., we usually describe or summarise them rather than quote verbatim sentences or longer phrases from the literature. We use verbatim quotations very rarely, at least in the natural sciences (more frequently in the humanities). If we really do wish to quote a text literally, word for word, this applies when the exact wording of the text is of primary importance. Understandably, in the humanities, where the thought itself and its exact flow is of value, such a verbatim citation may be important. In the natural sciences, however, there are specific facts, data, and results behind the words, and these are generally the most relevant. Hence, slightly different wordings can be used to describe them, which do not change how the facts/data are expressed, and thus the essence of the thing. If you want to quote something literally, it is best to use inverted commas and italics for this part of the text.

37. What does a publication citation look like and where should it be inserted?

    When referring, in whatever form, to someone's achievements, results, opinions, thoughts, to any source whatsoever, an appropriate citation, consisting of the name and year of publication, e.g. Bernard 2002 (or an abbreviation of the name of the document and the year of publication in the case of unnamed documents, e.g. Regulation 2019), should be included in the text in each case. This can be done in two ways:

    - in brackets, after the relevant part of the text that refers to that source, and often at the very end of the sentence, before the full stop, e.g. “Mediterranean taxa often show very pronounced genetic splits among different refugia, even on relatively small geographical scale within one Mediterranean peninsula (Schmitt 2007).”
        - if there are two authors, we write (Meinhard and Grill 2001) or with a comma (Meinhard, Grill 2001);
        - if there are three or more authors, we write (Geiger et al. 2010), sometimes with the Latin words in italics (Geiger *et al*. 2010);
    - using the authors' names (with the year in brackets) directly in a given phrase of the text, often as a subject, e.g. Smith (1967) stated that...; according to Bernard and Daraż (2018),....; as demonstrated by Smith *et al*. (1984), etc..;
    - in the case of a verbatim quotation, the reference may add the page of the source text on which the statement is found, e.g. (Smith 1967, p. 145).

    The frequency of use of a given citation:

    - is not standardised – it is based more on the need to cite a particular source in a particular place and in accordance with the writer’s judgement;
    - we do not use it more than once in a sentence;
    - unless there is a definite need, we also try not to use it in every subsequent sentence, but rather after a certain part of the text that is related to a given literary source;
    - it is, however, perfectly acceptable to use it several times in a paragraph if it contains various statements or observations that correspond to the source in question; if the entire paragraph is based on a single source (e.g. in review works), the appropriate

use of a citation at the beginning and end of the paragraph – or even just in one place – is acceptable.

It is sometimes the case that the same author published two papers in the same year and we want to cite both of them: in this case, we still need to add the lowercase letters a and b to the year of publication, e.g. (Bernard, Daraż 2018a, 2018b); also in the "Bibliography" it will then be necessary to consistently use the year with a letter.

38. Citation for several sources – In what order should they be placed?

When we wish to include citations for several literature sources in one set of brackets, we place them in order of publication dates, preferably separated by a semicolon, e.g. (Smith 1967; Bernard, Samoląg 2002; Aschenwald 2004; Bernard et al. 2010). If we cite two publications by Kowalski from different years, separated in time by publications by other authors, we can make some deviation here and put both publications by Kowalski in one place, even though the latter is later than the publication by the other author, i.e. (Smith 1967, 1993; Bernard, Samoląg 2002; Aschenwald 2004).

In the past, alphabetical order was often used for items cited in parentheses, i.e. according to the alphabetical order of the first authors followed by subsequent authors. This order was the same as in the "References" [or "Bibliography"] section (details there). The example above would have a different order in this version: Aschenwald 2004; Bernard, Samoląg 2002; Bernard et al. 2010; Smith 1967. The alphabetical order of items cited in brackets in the text is still used in some journals, but order by publication date is far more common.

39. Citations for Internet sources

If the web source is an online publication and has a specific author, we provide an in-text citation by author, just as we would for printed sources. The author in question will then be inserted in the "References" [or "Bibliography"] in alphabetical order, together with the bibliographic data, including the web address and date of access.

Example:

- in the text: (Stephenson et al. 2016)
- in the "References" ["Bibliography"]:
  Stephenson P.J., Soarimalala V., Goodman S. 2016. Limnogale mergulus. The IUCN Red List of Threatened Species 2016: e.T11979A97189690. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T11979A97189690.en. Access: 23.04.2019

If we refer in the text to an unnamed online source (database, website), we give:

- a source abbreviation and year, e.g. (IUCN Red List 2019)
- or the abbreviation of the web address and the year, e.g. (www.iucnredlist.org 2019).

In either case, the abbreviation will be deciphered, i.e. expanded to a fuller address at the end of the paper, in the “References” [“Bibliography”], where the full bibliographic details (including date of access) of the specific item from this Red List will be provided.

Example:

https://www.iucnredlist.org/resources/mappingstandards. Access: 23.04.2019

Alternatively, it is possible to provide the full web address (without access date) in the text, if it is very short. The same address, complete with the access date, will be repeated at the end in the “References” [“Bibliography”].

Tables and figures

40. Tables in the text. How to organise and describe them?

- Orientation of the table
  Most often vertical, but if necessary (a very wide table, numerous columns), it can also be horizontal. The latter can be achieved by separating the page with the table into a separate section and setting the horizontal page orientation in that section.

- Title and explanation of the table

  - Location
    The title always above the table, the explanatory notes, if present, preferably also above the table, starting with a new line under the title; in the past, the explanatory notes used to be placed below the table, but nowadays they are more often provided above the table – this has a practical implication: with longer tables, it is easier to decipher abbreviations from the table header in the nearby explanatory notes than to look for their meaning in explanatory notes located further away (sometimes on another page).

  - Autonomy
    The title (along with the explanatory notes) should be sufficiently autonomous so that after reading it, the reader is fully informed as to what the table is about and does not need to refer to the text of the paper to understand its contents. In some cases, however, it is possible to refer to another place in the work, e.g. a reference to the acronyms of locality names or to the detailed criteria of some division established in the work, once only explained in the chapter "Material and methods" or in another table/source.

    Example:

    > Table 1. Regions, sampling localities, their abbreviations, geographic positions of sampling sites, number of analysed individuals per gene 16S rRNA-ND1 and COII as well as detected haplotypes in *Nehalennia speciosa* over its entire trans-Palaearctic distribution.

  - Contents of the title and description

    Table number. Title of the table.
    Explanations (not always necessary): here we explain further abbreviations from the table header, if we have used any, and add any other explanations necessary for understanding the table contents, e.g. the source according to which we have used certain data.

    Examples:

Table 1. Threatened dragonfly species at the European and EU 27 level. Species endemic to Europe or to EU 27 are marked with an asterisk (*).

Table 2. Number of recorded individuals of particular species at each sample site in the Carex rich fen near Kępa (Central Poland).
Kind of samples: P – plant, T – thatch & litter, CS – control. Kind of sample site: D – disturbed, UND – undisturbed. Acronymes of species names: MOU – *Vertigo moulinsiana*, ANT – *Vertigo antivertigo*, ANG – *Vertigo angustior*, PYG – *Vertigo pygmaea*.

- Table header

A separate top part of the table, intended to explain the content of the vertical columns. The headings for each column must be very precise and clear (we do not assume that the reader will guess); sometimes they will simply be too long for the width of the column (even when broken into two or three rows), in which case we use a readable abbreviation, which we describe in the explanations above the table (below its title).

In some cases, where specific abbreviations coding data in the table header are repeated in many consecutive tables, one can dispense with repeating the explanation in each table and refer to a single explanation, which might be contained, for example, in another table, or possibly in "Materials and Methods" (e.g. acronyms of locality names).

- Dividing a table
Tables can be longer than one page. In such cases, part of the table goes on to the next page (or even pages), but on each subsequent page the relevant part of the table should begin with a repetition of the table header.

- Reference to a table in the text
    - There must be at least one reference to each table in the text of the paper, usually in the form of brackets containing the full word "Table" and the table number, e.g. (Table 1).
    - In doing so, we try to avoid phrases such as "is presented in Table 6" or "is included in the table below". Rather, it is the factual content of the sentence that corresponds to the content of the table, and the only direct reference are the parentheses with the table number.

Example:

„The total size of population was estimated at ca. 3600 individuals, with ca. 14% of generative fraction (Table 2)."

Such a reference to a table is substantive, concise and elegant.

41. Figures (diagrams, photographs)

- Together or separately
  All figures, maps, charts and photographs can be considered together as Figures. Moreover, they can be separated into two or three separate categories (Figures, Photographs, sometimes also Graphs, although there is, in fact, no justification for distinguishing the latter category). The option that is selected depends on the author/supervisor's preference, as well as on what type of figures appear in the text and how numerous they are.

- Location of figures
  We always try to place any figures close to where they are referred to in the text. This can be below, above, on an adjacent page on the same spread (i.e. one appearing in a pair of pages) or possibly overleaf on the next page (the latter option is inconvenient to use, but sometimes there is no other choice).

- Figure legend
  Figures, and especially maps, often have a legend enclosed. This may be very brief, e.g. stating only the sample size considered in a given analysis (e.g. N = 26), embedded in a given graph. Such a legend can take the form of colour-coded squares/points encoding specific categories, e.g. traits or individuals considered in a given graph. These coding colours may be described directly in the legend if the explanation is very short, e.g. in the form of a number or 1–2 words. They can also be described in coding numbers, which will then be explained in the figure caption.

- Figure caption

  - Location of the caption
    We always locate the figure caption below the figure.

  - Autonomy of the title
    The figure title should be sufficiently autonomous so that from it the reader obtains full information on what the figure shows and does not have to refer to the text of the work to understand its content. In some cases, however, it is possible to refer elsewhere in the work, e.g. to refer to the detailed criteria of some division or to the locality acronyms established in the work, once only explained in the chapter "Material and methods" or in another table/source.

  - Contents of the caption
    Figure number (e.g. Figure 1, can be abbreviated: Fig. 1). Title of figure.
    Explanations (not always necessary): here we explain further abbreviations/words/numbers from the figure, as well as adding any other explanations necessary to understand it.

Example:

> Figure 3. Occurrence of particular *Vertigo* species in the collected samples (1–34) in relation to the moisture level of the habitat (according to the scale by Killeen & Moorkens, 2003) in the Carex rich fen near Kępa (Central Poland).
> Abbreviations of species names: *V*. *mou*. – *Vertigo moulinsiana*, *V*. *ant*. – *Vertigo antivertigo*, *V*. *ang*. – *Vertigo a*ngustior, *V*. *pyg*. – *Vertigo pygmaea*.

If the figure is not original (i.e. our own), we should indicate in brackets at the end the source from which we have taken it, e.g. (Adamek 2001), (after Piotrowska 1994), (Atlas of the City of Poznań 2018). If the figure has been further modified for the purposes of the thesis, the word "modified" should be added, e.g. (after Piotrowska 1994, modified).

Frequently, in order to avoid descriptive categories in the figure caption such as "red points", a legend is included on the map/figure, where a red point is drawn and a number (e.g. 1) or a letter (e.g. A) is added, a black point – 2/B, etc. In this case, the explanatory notes in the figure caption already give only the coding numbers or letters and their explanations, e.g. 1 – historical sites; 2 – modern sites, etc. However, this is not an obligatory rule and verbal expressions (e.g. “red points”) of the symbols used in the figure are permissible.

Example:

> Fig. 1. Low frequency FL dissipates excess energy through the violaxanthin cycle.
> *Nannochloropsis gaditana* was cultured under continuous light or flashing light with duty cycle of 0.05 and frequencies of 5, 50, 500 Hz at an average light intensity of Ia = 300 µmol s−1 m−2. The numbers in the white box represent the fold-changes in the transcript abundance (mean of three independent experiments, two tailed Student’s t-test, $p < 0.05$). Numbers in brown, purple, green and sky blue represent the CL, FL5, FL50 and FL500 treatments, respectively. IM: inner membrane; LA: lamella; LU: lumen; M: stroma membrane; OM: Outer membrane; S: stroma; S T: thylakoids; VDE: violaxanthin de-epoxidase; ZE: zeaxanthin epoxidase.

It might also happen that the legend on the figure/map already contains an explanation, e.g. of the colour used (see above Figure legend). In this case, we do not need to repeat this explanation in the figure caption.

Example:

> Fig. 2 Diversity of lotic and lentic species of dragonflies: A diversity map of the 44 species predominantly breeding in lotic habitats; B diversity map

of the 99 species breeding in lentic habitats or commonly found in both lotic and lentic habitats
[both maps include a colour legend explaining the colour coding of the dots, i.e. immediately indicating the range of the number of species, e.g. the drawn red square 1–5 species, etc.].

With photographs, the photographer should be indicated at the end of the figure caption, in brackets, preferably in the form of the initial of the first name and surname, e.g. (photo R. Bernard) or (photographed by R. Bernard). The author of the thesis also indicates the photographs he/she himself/herself has taken in this way. In some cases, it is also reasonable to indicate the date on which the photograph was taken (in brackets with the photographer), although this is not necessary.

- Figure reference

The text of the thesis must refer to each figure at least once, usually in the form of brackets with an abbreviation, e.g. (Fig. 1).

In doing so, we try to avoid expressions such as "shown in the figure below". It is rather the content of the sentence that corresponds to the content of the figure, and the only direct reference is precisely the parentheses with the abbreviation and number.

Example:

> “The current distribution of N. speciosa shows a large gap in Asia between the West Siberian Lowland and the Amur province (Fig. 1).

Such a reference to the figure is substantive, concise and elegant.

Thesis review – form

42. Basic components of a review – what is assessed

The review of a diploma thesis conducted at Adam Mickiewicz University in Poznań has its own standardised framework: it is organised in accordance with several key points. Obviously, within these points very different content is possible, touching upon various, more detailed aspects. These points are given below in order to help future authors of theses get an idea of what the thesis supervisor and reviewer must address in their reviews. Within these points, a brief commentary is also provided for graduate students (which is not included in the review form), illuminating the essence of a particular aspect of the review.

- Does the content of the thesis correspond to the theme specified in the title?

  Comments on this aspect of the thesis are rather rare, but there are some papers where the theme specified in the title does not fully reflect the scope or thrust of the thesis. It is therefore also worth paying attention to this element when organising or finally writing the paper. A minor correction to the exact title of the thesis within the accepted theme is possible and does not require the approval of the programme board (the theme of the thesis is something a little broader than the exact wording of the title). Even the theme (topic) can be adjusted slightly if approval is obtained from the relevant programme board.

- Evaluation of the layout of the thesis, the structure of content distribution, the order of chapters, the completeness of the thesis, etc.

  This apparently more technical point, however, does not only relate to the correct structure of the thesis, but also touches on the logic in the argument, the particular order in which some content follows from other content and takes its place in the thesis, rather than mixing freely within and between chapters.

- Substantive evaluation

  Understandably, this is a key aspect of the work in question. At the same time, this point does not so much describe the content of the work as evaluate it. It indicates the volume and quality of the material, the correctness of the methods used and the analysis of the results and deductions, and finally, the key results and their interpretation. It indicates the strong and weaker substantive elements of the thesis. It highlights what is most valuable, and what constitutes progress, but may also disagree with something or remain unconvinced. It also often recognises the enormity of the work put in by the author.

- Does the thesis represent/introduce a new approach, and to what extent?

  "Novelty" is understood here in broad terms. It can refer to new data from an area, from the scope of an issue, new approaches/views, a new treatment of e.g. material, new substantive solutions. Whichever way one might understand it, it is not so much the rank of the achievement that is assessed here, but the original contribution by the author of a given paper to a given issue that has an element of novelty.

- Characteristics of the selection and use of sources

  In this section, the reviewer assesses the extent to which the selection of sources is complete/sufficient and relevant. What is also assessed is the ability to work with sources and apply them in the substantive description of the given issue, in the methods presented and in the skilful discussion of the results obtained.

- Evaluation of the formal aspect of the thesis (correctness of language, mastery of writing techniques, lists of tables/figures, references)

  In a master's thesis, not only the substantive elements, the correct structure and the ability to use sources are important, but also what we might term the 'technical elements'. It is understandable that reviewers do not regard this side of the thesis as the main aspect and are inclined to treat minor deficiencies of this nature leniently. However, the formal side of the thesis should not be underestimated: it has happened in several cases that numerous formal errors and carelessness have resulted in a lower overall grade being given to the thesis. Moreover, experience teaches us that working on the formal side take up a lot of the author's time and often also that of the supervisor, when this time is very valuable. Therefore, it certainly is worth working on the formal side as early as possible and with care!

- Use of the work (publication, making available to institutions, source material)

  This point of the review indicates its usefulness, possible use, e.g. for publication, as a reference for other works or as a starting point for further research, as solutions ready to be applied in practice, e.g. in nature/environmental protection, etc.

- Other remarks