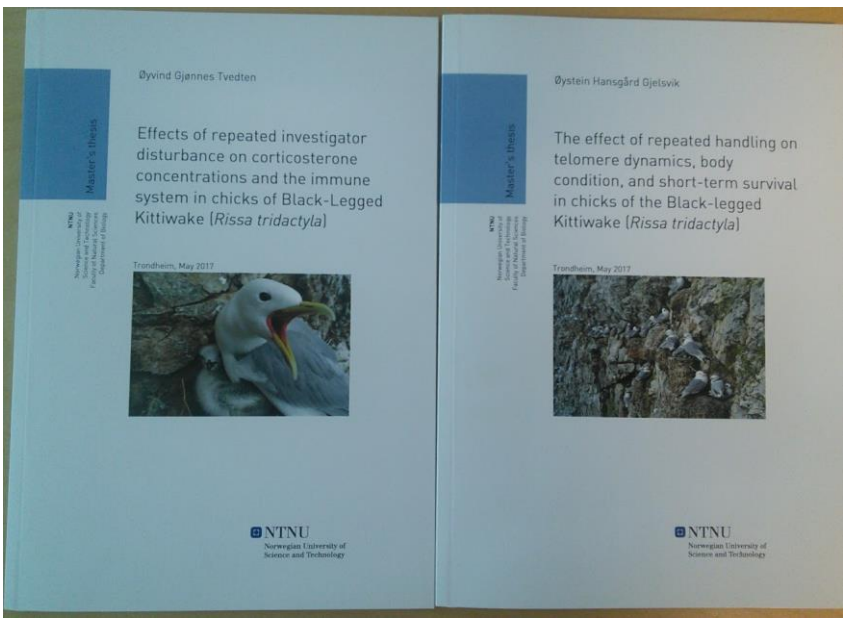
SCIENTIFIC AUTHORSHIP
-
WRITING A MASTER THESIS

Claus Bech, Dept. Biology, NTNU
August 2017

1

Goal: a Msc.-thesis….



2

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and…….

a good grade!
- or your manuscript accepted

3

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Vol. 393: 235–246, 2009
doi: 10.3354/meps08222

MARINE ECOLOGY PROGRESS SERIES
Mar Ecol Prog Ser

Published October 30

Contribution to the Theme Section 'Marine ecosystems, climate and phenology: impacts on top predators'

OPEN ACCESS

Climate change and phenological responses of two seabird species breeding in the high-Arctic

Børge Moe[1,2,*], Lech Stempniewicz[3], Dariusz Jakubas[3], Frédéric Angelier[4,5], Olivier Chastel[4], Frode Dinessen[6], Geir W. Gabrielsen[7], Frank Hanssen[8], Nina J. Karnovsky[9], Bernt Rønning[1], Jorg Welcker[7], Katarzyna Wojczulanis-Jakubas[3], Claus Bech[1]

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[7]Norwegian Polar Institute, 9296 Tromsø, Norway
[8]Norwegian Institute for Nature Research (NINA), 7485 Trond
[9]Department of Biology, Pomona College, Claremont, Californ

ABSTRACT: The timing of breeding is a life-history trait that can greatl
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seasonal peak in food availability. We analysed phenology (hatch dates)
for 2 seabird species breeding in the high-Arctic, little auks *Alle alle*
Rissa tridactyla, for the periods 1963–2008 and 1970–2008, respectively.
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surface temperature (SST) and a decrease in sea ice concentration. Little
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success, indicating poor investment and food availability. This study ide
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effects on snow cover limiting access to nest sites and the development
It remains to be investigated whether environmental factors are reliable predictors of marine prey
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4

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5

WHEN TO START?

- As early as possible!
- Use your project-description for your Master as a starting point. Use time and energy when preparing the project description – it will pay off in the end when writing your thesis!!
- Do not postpone processing your data! Get into the data-processing and -presentation (figures/tables) as soon as you get some data!

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6

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WHAT TO WRITE ABOUT?

- More important to write your thesis as a coherent story than to write about all you have done during the master study.
- Important to be able to remove irrelevant things from your thesis! Many students find this very difficult because they think they do not get 'credit' for all work done during the master study.

7

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TITLE?

- Heading
- As short and as precise as possible!
- Do not use 'A study of...' or 'Observations on.....' etc.
- Remember to use important words, so that other students/researchers will find your study when searching litterature databases.

8

TITLE – 3 types

- Descriptive (”classical”)
- Question
- Statement

9

DESCRIPTIVE

The Journal of Experimental Biology 212, 3060-3067
Published by The Company of Biologists 2009
doi:10.1242/jeb.029835

Food restriction in young Japanese quails: effects on growth, metabolism, plasma thyroid hormones and mRNA species in the thyroid hormone signalling pathway

Bernt Rønning[1,*], Anne S. Mortensen[1], Børge Moe[1,2], Olivier Chastel[3], Augustine Arukwe[1,†] and Claus Bech[1,†]

[1]Department of Biology, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway, [2]Norwegian Institute for Nature Research (NINA), Division of Arctic Ecology, NO-9296 Tromsø, Norway and [3]Centre d'Étude Biologiques de Chizé (CEBC), Centre National de la Recherche Scientifique, 79360 Villiers en Bois, France

*Author for correspondence (bernt.ronning@bio.ntnu.no)
†These authors contributed equally to this work

10

QUESTION

The Journal of Experimental Biology 210, 3407-3414
Published by The Company of Biologists 2007
doi:10.1242/jeb.005090

Is basal metabolic rate influenced by age in a long-lived seabird, the snow petrel?

Børge Moe[1,*], Frédéric Angelier[2], Claus Bech[1] and Olivier Chastel[2]

[1]*Department of Biology, Norwegian University of Science and Technology (NTNU), NO-7491 Trondheim, Norway and* [2]*Centre d'Étude Biologiques de Chizé (CEBC), Centre National de la Recherche Scientifique, 79360 Villiers en Bois, France*

*Author for correspondence at present address: Norwegian Institute for Nature Research (NINA), Division of Arctic Ecology, NO-9296 Tromsø, Norway (e-mail: borge.moe@nina.no)

STATEMENT

J Ornithol (2010) 151:723–727
DOI 10.1007/s10336-010-0510-3

ORIGINAL ARTICLE

Parent Kittiwakes experience a decrease in cell-mediated immunity as they breed

Juli Broggi · Magdalene Langset · Bernt Rønning · Jorg Welcker · Claus Bech

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”Catchy” titles are popular!

Survival of the fattest: body stores on migration and survival in red knots *Calidris canutus islandica*

R. I. Guy Morrison, Nick C. Davidson and Jim R. Wilson

R. I. G. Morrison (correspondence), Environment Canada, Wildlife and Landscape Science, National Wildlife Research Centre,

The Auk 115(1):196–203, 1998

GUTS DON'T FLY: SMALL DIGESTIVE ORGANS IN OBESE BAR-TAILED GODWITS

THEUNIS PIERSMA[1,2,4] AND ROBERT E. GILL, JR.[3]

[1]*Netherlands Institute for Sea Research (NIOZ), P.O. Box 59, 1790 AB Den Burg, Texel, The Netherlands;*

[2]*Centre for Ecological and Evolutionary Studies, University of Groningen,*

13

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36.2. Africa's coolest bird: Winter torpor in the freckled nightjar (*Caprimulgus tristigm*)

McKechnie, A.E., Brigham, R.M., Ashdown, R.A.M., and Christian, M.B.
School of Animal, Plant & Environmental, University of the Witwatersrand, South Africa

You are what your mother eats: evidence for maternal preconception diet influencing foetal sex in humans

Fiona Mathews[1,*], Paul J. Johnson[2] and Andrew Neil[3]

[1]*Hatherly Laboratories, School of Biosciences, University of Exeter, Prince of Wales Road, Exeter EX4 4PS, UK*

[2]*Wildlife Conservation Research Unit, Department of Zoology, University of Oxford, Tubney House, Tubney, Oxon OX13 5QL, UK*

14

LANGUAGE: English or Norwegian?

- Whatever you find most easy. Choose English if you think you really are able to write in English!
- Help with the language? Primarily your supervisor, but also fellow students, family etc.

15

WHAT FORMAT OF THESIS?

- Traditional thesis
  - a finished report
  - in Norwegian or English
- Manuscript
  - ready for submitting for publication in a scientific journal
  - in the 'style' of a specific journal.
  - in English

16

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TRADITIONAL THESIS

- PREFACE (Forord) – includes all thanks/acknowledgements
- LIST OF CONTENT (Innholdsfortegnelse)
- SUMMARY (a 'short version' of your whole work)
- INTRODUCTION (what you did and why you did it)
- MATERIAL AND METHODS (how you did it)
- RESULTS (what you found; incl. how your data was analysed)
- DISCUSSION (what you mean that your results show)
- CONCLUSION (a short summary of your scientific results)
- REFERENCES
- (APPENDIX)

17

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MANUSCRIPT

- CONTENTS (not to be sent to the journal)
- ABSTRACT (a 'short version' of your whole work)
- INTRODUCTION (what you did and why you did it)
- MATERIAL AND METHODS (how you did it)
- RESULTS (what you found; incl. how your data was analysed)
- DISCUSSION (what you mean that your results show)
    - CONCLUSION (a short summary of your scientific results)
- ACKNOWLEDGEMENTS (thanks, finansing, permissions osv)
- LITTERATURE (list of references)
- TABLES (one table on each page)
- FIGURE LEGENDS (text to figures)
- FIGURES (one figure on each page)
- (APPENDIX)

18

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WHERE DO YOU PLACE FIGURES AND TABLES?

Traditional thesis:

- Figures and tables to be placed as an integral part of the thesis – side by side with the text.

Manuscript:

- At the very end; *i.e.* after the list of references

Different views on what format to use among the supervisors at the Biology department – and between departments!

19

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ABSTRACT

- The content of an abstract is a short description of the problem you have addressed, what you did, what you found, and your conclusions.
- It should be a summary of the WHOLE THESIS! Has been described as a 'linear, proportional, reduction' of the thesis.
- Can be written in 'third person' (i.e.: 'the length was measured' and not 'I measured the lenght')

20

INTRODUCTION (I)

- Introduce the reader to the area of research, which is relevant for your work.
- Provide enough information to understand what you did and why you did it.
- Give a survey of the literature to show the 'position' of your work within the field of research.

INTRODUCTION (II)

- Give a clear, precise, purpose of your study. In this, you have to give the predictions for your study (what results you are expecting) and why you expects these results (rasjonalen for hypotesen).
- Can you include the results and conclusions in the introduction? – Seen more often in scientific publications nowadays.
- Ratnoff (1981) writes: '*Reading a scientific article isn't the same as reading a detective story. We want to know from the start that the butler did it*'

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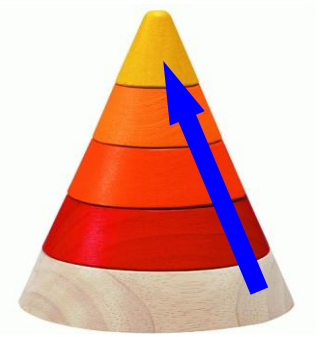
INTRODUCTION (III)

- Why interesting?
- What do we know from before?
- What do we NOT know?
- **What is the mystery?**



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MATERIAL AND METHODS

- Keyword: *Precision*.
- The purpose of this section is to produce so much (detailed) information about how you performed your study, that it makes the reader able to reproduce exactly what you did.
- You should begin writing this early in the process (if not written down, you are likely to forget what you have done)
- A separate section on statistics.

RESULTS

- Presentation of your data. What is **NEW**.
- The presentation should include both the data and the analyses of the data.
- It is important that you show the ability to distinguish between what is important and what is not. All data, whis will be commented on in the discussion need to be presented (no matter how difficult they are to handle statistically).
- Statistical analyses.

25

DISCUSSION

- You can start this section with a discussion of the methods used in the study.
- Otherwise there are 3 parts in the discussion:
- 1) *Your findings.* A short summary of your main findings. That is, a shortversion of your results.
- 2) *What are the meaning of your findings?* This is where you discuss possible explanations for your findings. Remember that you are more likely to see obvious connections and draw conclusions that the reader may not immediately see – therefore: you should also write some 'obvious' things.

26

- 3) *What are the implications of your findings?* This is where you go back to what you wrote in your introduction, but now with your own results as a 'joker'. You should also include a short discussion about in which direction this research field should go.
- Finish your discussion with a paragraph or two in which you summarise your main conclusions.
- Draw powerful conclusions (’a punchline’).

27

DISCUSSION

Two ways of getting it wrong:

- Being too modest
  - impression: nothing new here
- Being too pushy
  - impression: you disregard everything done before you

28

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CONCLUSION

- A short survey of the scientific results which your study has provided to the scientific community!
- - is often followed by ’where to go next’

29

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HOW SHOULD THE TEXT BE WRITTEN?

- What is characteristic of ’scientific' writing?
- **Passive** or
  ’An experiment was performed'
  ’It was found that…'

  active?
  ’I performed an experiment'
  ’We found that..'
- It used to be most ’correct’ to write scientific publications/theses in the passive form. I later years, however, it has become more accepted to write science in the active form.

30

The use of references

- Whenever you write *e.g.* 'It has been *found* that', 'it has been *argued* that' eller 'it has been *claimed* that', you need to **document** it with one or more references.

> The higher basal metabolic rate (BMR) of birds (Nagy et al. 1999*b*) has been suggested as one explanation for the higher FMR of birds compared with mammals. A similar proposal has been made between groups of birds, for example, marine versus terrestrial birds (Bennett and Harvey 1987). Intraspecifically, however, a similar relationship among individuals is yet to be found (Nagy et al. 1999*a*). It has been suggested that BMR represents the metabolic machinery that limits metabolic output (Daan et al. 1990). Individual variations in BMR might

31

REFERENCES

- Keep track of the papers you read – and need for your thesis! Specific programmes for this, *e.g. Endnote, GetARef, Reference Manager* etc.
- Which reference(s) to cite? Use the most 'original' one!
- Can you refer to papers you haven't read?
- Format of your list of references: use whatever you like best!
- BUT: it is important to be **CONSISTENT** in the use – and that the list of references is in accord with the text!

32

The same paper – but different stiles of citing it:

Monaghan P, Bolton M, Houston DC (1995) Egg production constraints and the evolution of avian clutch size. Proc R Soc Lond B – Biol Sci 259: 189-191

MONAGHAN, P., M. BOLTON, AND D. C. HOUSTON. 1995. Egg production constraints and the evolution of avian clutch size. Proceedings of the Royal Society of London Series B - Biological Sciences 259: 189-191.

Monaghan, P., Bolton, M. and Houston, D.C. (1995). Egg production constraints and the evolution of avian clutch size. *Proc. R. Soc. Lond. B – Biol. Sci.* **259**, 189-191

Monaghan, P., Bolton, M. & Houston, D.C. Egg production constraints and the evolution of avian clutch size. *Proc. R. Soc. Lond. B – Biol. Sci.* **259**, 189-191 (1995).

Monaghan P., Bolton M. and Houston D.C. (1995) Proc. R. Soc. Lond. B – Biol. Sci 259:189-191

33

How to list references - in alphabetic order!

- Alphabetic after first author.
- If there are more papers by the same first author:

  - List <u>after year of publication</u> within these groups:
  - FIRST ’if only one author’
  - THEN ’two authors’
  - THEN ’three or more authors’ (*et al.*)

34

Example:

Ricklefs, R. E. (1983). Some considerations on the reproductive energetics of pelagic seabirds. Stud. Avian Biol. 8: 84-94

Ricklefs, R.E. (1987). Community diversity - relative roles of the local and regional processes. Science 235: 167-171.

Ricklefs, R.E. (2002). Splendid isolation: historical ecology of the South American passerine fauna. J. Avian Biol. 33: 207-211.

Ricklefs, R.E., Bermingham, P. (1999). Taxon cycles in the Lesser Antillean avifauna. Ostrich 70: 49-59.

Ricklefs, R.E., Scheuerlein, A. (2002). Biological implications of the Weibull and Gompertz models of aging. J. Geront. - A. Biol. 57: B69-B76.

Ricklefs, R.E., Konarzewski, M., Daan, S., (1996). The relationship between basal metabolic rate and daily energy expenditure in birds and mammals. Am. Nat. 147: 1047-1071.

Ricklefs, R.E., Latham, R.E., Qian, H. (1999). Global patterns of tree species richness in moist forests: distinguishing ecological influences and historical contingency. Oikos 86: 369-373.

35

If more in the same year: use *a*, *b* etc.:

Nagy K.A., V.M. Gavrilov, A.B. Kerimov, and E.V. Ivankina. 1999*a*. Relationships between field metabolic rate, basal metabolic rate and territoriality in passerines. Pp. 390–400 in N.J. Adams and R.H. Slotow, eds. Proceedings at the 22d International Ornithological Congress, Johannesburg, August 16–22, 1998. BirdLife Africa, Johannesburg.

Nagy K.A., I.A. Girard, and T.K. Brown. 1999*b*. Energetics of free-ranging mammals, reptiles and birds. Annu Rev Nutr 19:247–277.

gated the proximate causes of this variation in free-ranging birds (see Tindbergen and Dietz 1994; Nagy et al. 1999*a*). A large interspecific variation in FMR (the highest being almost six times greater than the lowest) exists after adjusting for body mass and phylogenetic order (Nagy et al. 1999*b*). Intraspecifically, the relationship between FMR and body mass is not as

36

If you cite more papers, sort either after year or first author (be consistent!)

Johnson 2004). In addition to genetic and environmental effects, intraspecific variation in BMR may be due to developmental factors or to strategic decisions (Dawson *et al.* 1983; Burness, Ydenberg & Hochachka 1998; Swanson & Olmstead 1999; Nilsson 2002; Bech *et al.* 2002; Wikelski *et al.* 2003; Broggi *et al.* 2005).

37

PLAGIARISM

- What is a plagiarism?
- **Never!**
- Servere consequences!

38

USE OF TABLES AND FIGURES

- Are used to present *summaries of the results*.
- You should present your data in either a table or in a figure. NOT both ways! The most important data should also be mentioned in the text. You are – of course – allowed to present data in the text only!
- **FIGURES** are best to use when *trends or forms* in your data are important for you to express.
- **TABLES** should be used if you want to present *exact numbers or values.*
- You can present tables and figures also in the discussion!

39

FIGURES

- A good figure:

- emphasises and supplements what you have written in the text
- contains only essential information
- leaves out visually disturbing details
- is easy to read
- is produced such that the purpose is obvious
- is consistent with – and made in the same fashion as – your other figures
- is carefully planned and produced

- Use specialised data-programmes to produce your figures, *e.g. SigmaPlot*

40

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TABLES

- The reader should be able to quickly to understand the presented data and see patterns and connections between the presented data.
- It is often best *first* to prepare your table in such a manner that it gives maximal information, and *then* write the text that deals with this particular table.

41

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AVAILABILITY OF YOUR THESIS AFTER YOU HAVE FINISHED?

- Reduced availability only if there are VERY GOOD REASONS to this!

42

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PUBLISHING YOUR THESIS?

- Part of the ’Master agreement’
- Talk to your supervisor about this!

43

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GOOD LUCK ON YOUR ’JOURNEY’!

44