

Emnerapport BIO301 vår 2018

Tittel: BIO301, Current topics in Biodiversity, Ecology and Evolution, vår 2018

Undervisarar: Øyvind Fiksen (emneansvarleg, 40%), Anders O Opdal (assistent, 30%), Selina Våge (assistent, 30%)

Gjennomføring

Kursdesign: Ein detaljert oversikt over emnedesignet, læringsaktivitetar, og vurderingsformer er lagt ved her (Vedlegg A).

Oppfølging av eventuelle tidlige evalueringer: Emnet gjekk i omtrent samme format som i 2017, med tre gruppeoppgåver med studentpresentasjonar og ein skriftleg innlevering av ein prosjektsøknad, med peer-review. Vi er ganske godt fornøgd med opplegget, men har forsøkt å gi meir systematisk, kriteriebasert tilbakemelding undervegs enn i fjor. Dette kan enda bli betre, det er relativt krevjande å sette kriterier for vurdering for enkelte aktivitetar, som studentpresentasjonar, på dette nivået.

Kursstatistikk: Det var 8 studentar påmeldt, to trakk seg undervegs, og vi gav 2 A og 4 B til dei som fullførte.

Studentevaluering: Vi la ut eit skjema der studentane kunne gi oss tilbakemelding kontinuerleg gjennom emnet, men her kom det ingen kommentarar. Vi har diskutert opplegget muntleg med studentane undervegs, og generelt så er det relativt arbeidskrevjande å finne og sortere, og lese seg opp på eit ukjent felt. Men vi har samtidig inntrykk av at det er god trening og læring i det.

Emneansvarlig sin samlede vurdering, med eventuelle forslag til endringer

Dette er eit lite emne, med bare 6 studentar i år, så ein kan sjølvsagt vurdere å legge det ned. Vi har lagt det opp som trening i å finne litteratur om tre utvalgte tema i evolusjon og økologi, for å trene opp evnen til å oppsummere eit felt og presentere for andre, og øving i å utforme eit forskingsprosjekt, skrive ein søknad, og å gi/få tilbakemelding til andre. Emnet legg altså meir vekt på generiske ferdigheiter, kritisk lesing, evne til å sette seg inn i eit tema, arbeide i grupper, formidle.

BIO 301 Spring 2018, Current topics in Biodiversity, Ecology and Evolution

In this course students learn how to find, interpret, present, and write about selected themes in ecological, evolutionary and biodiversity research. Themes can vary from year to year, and students work both individually and in groups to address questions, solve problems and develop recommendations. For each theme, students have to develop an overview of important papers, debates and research questions, and collaboratively report it back to the other students and/or develop a recommendation for policy or future research based on the scientific literature. Students will discuss and interpret research articles in the field, and conduct assignments including writing assignments, mini-literature reviews and exercises. A key component of the course will be the development of a small research proposal, an introduction or a literature review, which will be peer reviewed by other members of the group, and resubmitted in revised form.

After the course, you should be able to:

1. Achieve an overview of ecological/evolutionary questions based on the scientific literature and databases
2. Critically reflect upon research methods, conclusions and statements in the discipline
3. Summarize and present advanced ecological/evolutionary themes
4. Develop, assess and give feedback on scientific texts, reviews or project proposals
5. Identify research needs and develop projects and applications

First meeting: 16th of January in room K1 at BIO, ground floor, A-building

Class meetings: see schedule below, and Mitt UiB, where information will be given

Teachers: [Anders F Opdal](#) (postdoc), [Selina Våge](#) (postdoc), [Øyvind Fiksen](#) (prof.)

Assessment: The course is inspired from Team Based Learning, where students work in groups parts of the time. Portfolio assessment, where all or selected elements of documented work (assignments, group projects, presentations etc) are included in the final assessment.

Required reading: As a part of the course, students search for and select relevant scientific literature on their own, using ISI Web of Knowledge or similar databases.

Learning outcomes and activities

- To be demonstrate abilities to **achieve an overview of ecological/evolutionary questions based on the scientific literature and databases** you need to
 - Select 3 themes or topics with your group, one from each teacher's list of alternatives
 - For each topic – search scientific databases. Develop an extensive list of relevant papers (10-20), and select a subset of key research papers, reviews or opinions (about 70 pages per topic). Justify the selected reading list with one sentence each. Explain and discuss the selection with teachers. Read papers and collaborate to establish your interpretation of the state-of-the-art, contemporary discussion themes, etc. and develop a presentation to for the class based on the selected literature.
- To be able to **Critically reflect upon research methods, conclusions and statements in the discipline:**
 - Include critical reflections on current research approaches, methods and conclusions (for selected themes) in portfolio elements.
- **Summarize and present advanced ecological/evolutionary themes**
 - Presentations in class, write research proposal

- **Develop, assess and give feedback on scientific texts, reviews or project proposals**
 - Review proposals individually.
- **Identify research needs and develop projects and applications**
 - Write and review proposal, select some applications for funding with limited budget.

Workload: Each of the learning activities involve a certain number of hours of work. Remember, 260 hours is the standard workload for 10 ECTS. Summary of workload and assessment weight:

Learning activity	#	Time factor	Hours	Assessment
Contact meetings	10.0	2.0	20.0	
Reading selected papers	210.0	0.4	73.5	
Tutorials	3.0	2.0	6.0	
Search and select literature (group)	3.0	15.0	45.0	15.0%
Presentation of theme (group)	3.0	15.0	45.0	30.0%
Write proposal individually	1.0	45.0	45.0	30.0%
Review proposals (ind)	2.0	10.0	20.0	15.0%
Select proposals (group)	1.0	10.0	10.0	10.0%
In total			265	100.0%

Elements of assessment criteria (first part)

Literature selection: It is challenging to define exact evaluation criteria for the literature search and selection exercise, but we will be looking for some specific elements. You must agree on one long list of relevant papers (max 20) and from this list select papers constituting ca 70 pages in total, and justify your selection of each with one sentence. The selected papers should be (a mix of):

- important in defining the research in the field (citations, reviews)
- cutting edge research, representing state-of-the-art approaches
- pointing at the historical origin and development of the field
- balanced if there are controversies
- papers with strong scientific basis, powerful methods, clarity & elegance

Oral presentation of theme: Each group select three themes to present from the alternatives given by each teacher and according to the schedule in the table below. All participants in the group must be prepared to present on behalf of the group, and we draw two presenters from each group randomly each time (one for the first part and one for the second part). We will also find one day where those who are not present get a chance to present. In the presentations, we will be looking for:

- Scientific relevance to the questions asked
- A reflective and objective attitude, where statements and conclusions are firmly backed by references to observations and theory
- Ability to give an overview and summarize while at the same time point out the details in some selected papers
- Clarity of the presentation, that it can be understood and followed by the audience
- ... to be discussed with the students.

Peer assessment of student contributions in the group. The score of the group for the literature selection and the group presentation includes an element of peer assessment. At the end of the group

project, all students distribute a score to all other group members based on how they have contributed to the group project. The weight of the peer assessment is open for discussion.

Research proposal, review and evaluation: We will present and discuss the criteria for these elements later in the course.

Themes and schedule for Current topics in biodiversity, ecology and evolution

We propose some alternative themes from each teacher, and your group must select one from each.

1. Øyvind Fiksen

Microplastic in the ocean – how harmful is it to marine ecosystems and seafood quality? The occurrence of small plastic particles in the ocean is a topic that make news headlines regularly. Researchers have now measured or monitored concentrations in coastal and oceanic regions, and exposed organisms to microplastic in the lab to study the effects on both individuals and systems. Here you set out to review the growing literature on microplastics in the ocean. First, summarize the issues raised in the scientific papers, what do we know and what is still uncertain or unknown? What is the concentration of microplastics? Then, as critical researchers, can you identify any bias in how results are presented in the papers? Based on your reading of the papers, discuss within the group and present your own views on microplastic as pollution in the ocean, how severe is the problem?

2. Selina Våge

On the origin of (simple and complex) life. Search for theories and discussions on the origin of life (focus on prokaryotes), and how life developed in its early stages. What do we know about this? Are there controversies? Further, explore the origin of complex (eukaryote) life. UiB will mark this year's Darwin Day (20. February) with a [Horizon lecture by Nick Lane](#), a leading scientist in the field of origin of complex life. You are strongly encouraged to attend his lecture; Why is complex life the way it is? Could there in theory be different types of complex life? Or, is complex life as we know it predictable from first (physical and chemical) principles? What makes sex and suicide so interesting? Use primary literature to explain how particular (bioenergetic) constraints may give some answers to these fascinating questions. You are free to choose how much you want to focus on the origin of simple life (first part) or complex life (second part), but you need to briefly introduce both themes, using primary literature.

3. Anders Opdal

- a. *Human induced evolution.* In 1859, when Charles Darwin presented his theory on evolution by natural selection, evolution was understood as a rather slow process typically requiring thousands to millions of years before materializing as visible adaptations or in speciation (i.e. the Galapagos fitches). However, to explain his theory, Darwin frequently used examples from pigeon breeding and the domestication of farm animals to illustrate how selection works. At the time it was well known that by selecting for certain desirable traits, one could over a few generations greatly magnify this trait in a population. For example as ornamentation on pigeons, or the amount of milk a dairy cow could produce. In the wild, evolution would work similarly, but because selection is natural and not planned, it would be slow. What Darwin did not predict was the potential effect humans could have on the course of evolution, also in the wild – known as human induced evolution. What is this, and how can humans influence evolution? Do you see similarities to Darwin's breeding examples? Find a few examples of fields where human induced evolution is a major concern. What are the major challenges

there? Often, human induced evolution is considered something we should avoid, but can there also be upsides?

- b. *The evolution of life histories.* Up until the mid 1900s, evolutionary theory was primarily focused on the natural selection for various physical traits, such as function, shape and size of various bodily structures like jaws, limbs, skin, eyes etc. However, apart from species having elaborate and diverse sets of body parts and functionality, evolutionary biologist came to appreciate that species also exhibit diverse and complex ways of living life (life histories), which again must also be subject to natural selection. Through literature searches, try to identify some key articles or books that addressed this new addition to evolutionary theory. In what ways does life history evolution broaden our view of evolution, and how does it connect to the previous views of evolutionary processes? Can the theory be used for any practical purposes?

Schedule BIO301 Spring 2018.

Date	Teachers	Learning activity and deadlines	Student work
Monday 15.01 14:15 K1	ØF	Introduction to the course. Establish teams. About working in teams. Presentation of themes by teachers	Start searching for relevant literature for each theme.
Tuesday 16.01 12:15 K2	ØF	Searching for research – how we do it. How to navigate in scientific literature	Discuss in groups – decide on 3 themes to focus on
Thursday 18.01 10:15 K1		Groups meet – teachers available	Develop literature list. Read papers.
Monday 22.01		Groups meet – teachers available	Develop literature list. Read papers.
Tuesday 23.01		Groups meet – teachers available	Develop literature list. Read papers.
Thursday 25.01		Groups meet – teachers available	Develop literature list. Read papers.
Monday 05.02		Groups meet – teachers available Final reading list Theme 1	Prepare presentation Submit literature list Theme 1
Tuesday 06.02		Groups meet – teachers available	Prepare presentation
Thursday 08.02		Present Theme 1	Presentations in class
Monday 19.02		Groups meet – teachers available	Develop literature list. Read papers.
Tuesday 20.02		Groups meet – teachers available NB! Why is life the way it is?	Develop literature list. Read papers.
Thursday 22.02		Groups meet – teachers available	Submit literature list Theme 2 Prepare presentation
Monday 05.03		Present Theme 2	Presentations in class
Tuesday 06.03		Groups meet – teachers available	Develop literature list. Read papers.
Thursday 08.03		Groups meet – teachers available	Develop literature list. Read papers.

Monday 19.03		Groups meet – teachers available Final reading list Theme 3	Submit literature list Theme 3 Prepare presentation
Tuesday 20.03	ØF	Present Theme 3	Presentations in class
Thursday 22.03	AFO, SV, ØF	Writing proposals, planning science	Lecture/Tutorial/Discussion
Monday 03.04		No meeting	Work on your research proposal
Monday 16.04		No meeting	Work on your research proposal
Tuesday 17.04		No meeting	Work on your research proposal
Thursday 03.05		No meeting	Work on your research proposal
Monday 07.05		Deadline submitting research proposal	
Wednesday 16.05		Deadline review of proposals	
TBD	AFO, SV, ØF	Board meeting: shortlisted proposals. Justification of selection	Groups present their decisions on funding to research proposals