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Evaluation of the Graduate Program Ecology



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Evaluation of the
Graduate Program Ecology

offered by the
Institute of Environmental Sciences

at the
University of Zurich



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Summary

Graduate programmes are important instruments in academic education that have become increasingly widespread in the last decade. The Graduate Program Ecology was started in 1999 as a pioneer programme at the Institute of Environmental Sciences at the University of Zurich. The programme aims to foster both the research skills of PhD students in the interdisciplinary field of ecology, and general skills highly requested by the academic and non-academic job market. In 2005, the Life Science Zurich Graduate School (LSZGS) was founded as a common platform for the recruitment and education of PhD students at the University and ETH Zurich. The Graduate Program Ecology is the oldest out of nine graduate programmes currently offered by the LSZGS.

Almost ten years of experience and the new environment of the LSZGS provided good reasons for an evaluation, in order to further develop the programme. Moreover, a first evaluation of the programme in 2001 lays back eight years.

We surveyed the students participating in the programme in January 2009 (n=48), including students that had recently finished the programme (within 2007 and 2008, n=22). Our aim was to assess the satisfaction of the students with the Graduate Program Ecology, and to identify gaps and potential for improvement. In addition, we surveyed all former students of the programme (1999-2006, n=59) to investigate what former students remember from the Graduate Program Ecology, and what proved most useful for them retrospectively. We were also interested to know what these people are doing now.

The active and recent students in the Graduate Program Ecology rated the programme as good. Out of the four modules that structure the course programme, the *Methods* and *Skills* modules were considered more important than *Specific subject matters* and *Research seminars*. These results are highly consistent with those from the evaluation in 2001. The indisputable strengths of the Graduate Program Ecology are the courses on Statistics and Scientific writing. Current and former students found these courses most important, and with regard to statistics even suggested additional courses for the future. More courses could be offered from the category of “soft skills”, useful for jobs in and outside academia. Although little was criticized in general, the course programme in the *Specific subjects matters* module and the timing of courses could be improved. A few students were not happy with the structure of the graduate programme in four modules.

We conclude that the Graduate Program Ecology successfully adds to the education of students carrying out a PhD, and that its current strengths should be maintained or even enhanced. Moreover, this evaluation shows how the programme can be developed further.

1 Introduction

1.1 History of the Graduate Program Ecology

The Graduate Program Ecology¹ was launched at the Institute of Environmental Sciences in the summer term 1999. It was run as a pilot project and evaluated after three years (Lindemann-Matthies 2001). Thereafter, the programme became an essential part of the teaching programme at the Institute of Environmental Sciences, attracting PhD students from a number of other institutes and institutions in and around Zurich. The programme can be seen as a model graduate programme, pioneering the current strategies of the Swiss National Science Foundation (SNSF 1999) and the Rector's Conference of the Swiss Universities (CRUS 2006) which aim to establish and foster specific doctoral programmes (or graduate programmes/schools, respectively)². Moreover, such doctoral programmes conform to a European trend towards more structured doctoral education enforced by the Bologna reform³, as opposed to the informal "apprentice-ship model" (Baschung 2007 and 2008). According to CRUS (2006), doctoral programmes should meet the following criteria:

- 1 Organized doctoral education according to scientific criteria including selection and recruitment of applicants
- 2 Courses of study available beyond the master's level, namely 3-4 ECTS-Credits per doctoral student and year, amounting to 12 credits for the duration of a PhD
- 3 Creation of an environment („espace collectif“) to foster interaction and exchange among students and among students and experienced researchers, including mentoring beyond the doctorate.

The Graduate Program Ecology became part of the newly founded Life Science Zurich Graduate School⁴ in December 2005, as the oldest out of nine graduate programmes offered. The programme not only aims to foster the education of PhD students regarding their research skills in the interdisciplinary field of ecology, but also regarding general skills highly requested by the academic and non-academic job market. The latter is also strived for through the doctorate's integration in Bologna (Baschung 2007).

1.2 The current Graduate Program Ecology

The programme is organized in four modules: courses on (1) *Specific subject matters* and (2) *Methods*, (3) *Skills* training courses, and (4) *Research seminars*. In courses on *Specific subject matters* and *Methods*, students train on subjects not offered during Diploma or MSc courses but with direct relevance to their PhD work. *Skills* courses provide training of skills useful for the students to carry out their research projects but also in their later job, be it in or outside academia. *Research seminars* and the joint graduate programme in general foster exchange and collaboration among students of different subdisciplines. To

¹although British English is used throughout this report, we use the official American English spelling of the Graduate Program Ecology

²e.g., "Switzerland: Towards the Future" (Schreiterer 2002), *NCCR* National Centres of Competence in Research (SNSF 1999), and *ProDoc* - a joint programme of the SNF and CRUS www.snf.ch/D/foerderung/personen/prodoc

³Graduiertenkollegs der DFG (DFG 2005, www.dfg.de/gk)

⁴www.lifescience-graduateschool.ch

complete the graduate programme during their PhD, students must acquire a minimum of 12 credits through successful completion of courses (1 credit = 1 hour per week for a whole term, German: Semesterwochenstunde). Thereby, a minimum of three credits must be acquired from each of the four modules. Further information on the Graduate Program Ecology is available on the internet⁵.

1.3 Why an evaluation?

By January 2009, the Graduate Program Ecology had been established for almost ten years. At that time, 81 students had already completed the programme while 48 students were enrolled as active participants. Ten years of experience, the first evaluation already eight years past, and the relatively new situation of the programme as part of the Life Science Zurich Graduate School provided good reasons to evaluate and further develop the programme. In particular, we were interested in answering the following main questions:

- 1 How satisfied are the students with the Graduate Program Ecology in general and with the course programme in particular?
- 2 How could the course programme be further developed and improved?
- 3 Who participates in the programme and why?
- 4 How does the newest generation of students rate application via the Life Science Zurich Graduate School?

Considering all students formerly enrolled in the programme, we were interested in answering three additional questions:

- 5 What do former students remember of the Graduate Program Ecology and what proved most useful for them?
- 6 How many scientific papers did they publish from their PhD?
- 7 Who studied in the programme and what are these people doing now?

2 Methods

We evaluated the Graduate Program Ecology in two separate surveys: Firstly, we surveyed all active students in January 2009 ($n=48$) and additionally included the students who had recently completed the programme, i.e., within 2007 and 2008 ($n=22$). Secondly, we surveyed all former students that had been enrolled in the programme between 1999 and 2006 ($n=59$).

2.1 Survey 1: Active and recent students

Before starting this survey, we interviewed six active students in the programme to receive a first impression of how students feel about the programme and to collect suggestions for its future, i.e. in particular courses that might be offered. Based on these interviews which included six questions, we then composed the survey questionnaire including a total of 25 questions organized in four sections (see Appendix C for questionnaires):

⁵www.uwinst.uzh.ch/index.php?site=teaching/graduate/graduate

- A General evaluation of the current Graduate Program Ecology
- B Future development of the Graduate Program Ecology
- C Information on the participants in the Graduate Program Ecology
- D For applicants via the Life Science Zurich Graduate School

The online questionnaire was created using the survey tool SurveyMonkey.com, and was opened on 20 January 2009 when all participants received a link to the questionnaire via e-mail. The survey was closed on 20 February, after sending out two reminders.

As a follow-up to this survey, we further investigated which courses should be offered in the near future, using a Delphi study approach. In a first step, all choices from Question 11: “What additional courses should be offered in future by the Graduate Program Ecology? (Multiple answers are possible)”, and the suggestions through the “Other (please specify)” option were combined in a new multiple choice question, in which each respondent had to choose his/her most favourite three courses. Based on the answers, we evaluated the 11 most favoured new courses. In a second step, the respondents had to rank these 11 courses.

2.2 Survey 2: Former students

This survey included 14 questions organized in three sections (see Appendix C):

- A Evaluation of the Graduate Program Ecology in retrospective
- B Publication output from your PhD
- C Information on former participants in the Graduate Program Ecology

The survey was opened on 12 February and closed on 20 March 2009, after sending out two reminders.

2.3 Response rates

A rather high percentage of active and recent students (70.0%) and former students (67.8%) responded to our survey (Table 1). Whereas for active students, the chance to participate in shaping the future of the programme should be an obvious motivation, the response rates of students who already finished the programme (both before or after 2006) are equally high. Reasons could be good reminiscences of the Graduate Program Ecology as an important stage in people’s lives, or loyalty towards the Institute of Environmental Sciences.

Table 1: Respondents

Survey	Student	<i>n</i>	No. of Responses	% Responses
1	Active students (January 2009)	48	33	68.8
1	Students completing in 2007/08	22	16	72.7
2	Former students (1999–2006)	59	43 ^a	67.8

^a Three out of 43 respondents did not fully complete the questionnaire.

3 Results Survey 1—Active and recent students

3.1 Evaluation of the current Graduate Program Ecology

Questions 1 – 3: Rating of the programme. The overall mean rating of the Graduate Program Ecology was good (Fig. 1). With regard to the benefits of the course programme, students rated benefits for themselves highest, followed by benefits for their PhD theses and later professional benefits (Fig. 2). Courses on *Methods* received the highest mean rating, followed by *Skills* training courses, courses on *Specific subject matters*, and *Research seminars* (Fig. 3). While all of the modules were considered important (all average ratings > 3), the training of *Methods* and *Skills* was clearly considered more important than training in *Specific subject matters* and *Research seminars*.

Questions 1 – 3 were asked identically in the Evaluation 2001 (Lindemann-Matthies 2001). The answers were very similar to those in 2001, and chi-squared tests revealed no statistically significant differences between answers from 2009 and 2001 for any of the questions. However, differences in the average rating between the four modules were smaller in 2009 (Fig. 4).

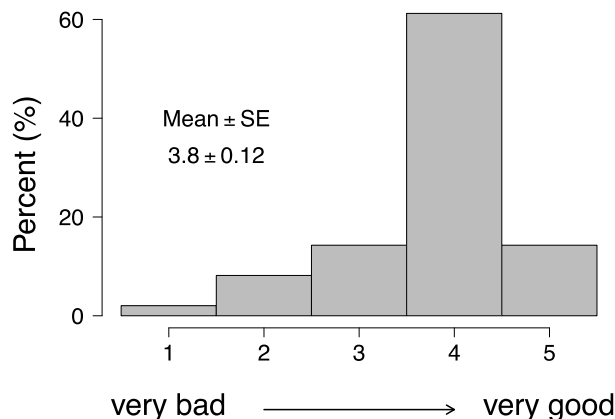


Figure 1: *Q1: How would you rate the current Graduate Program Ecology?* n=49. Numbers on the x-axis indicate ratings from 1 (very bad) to 5 (very good), with 2 (bad), 3 (satisfactory), 4 (good).

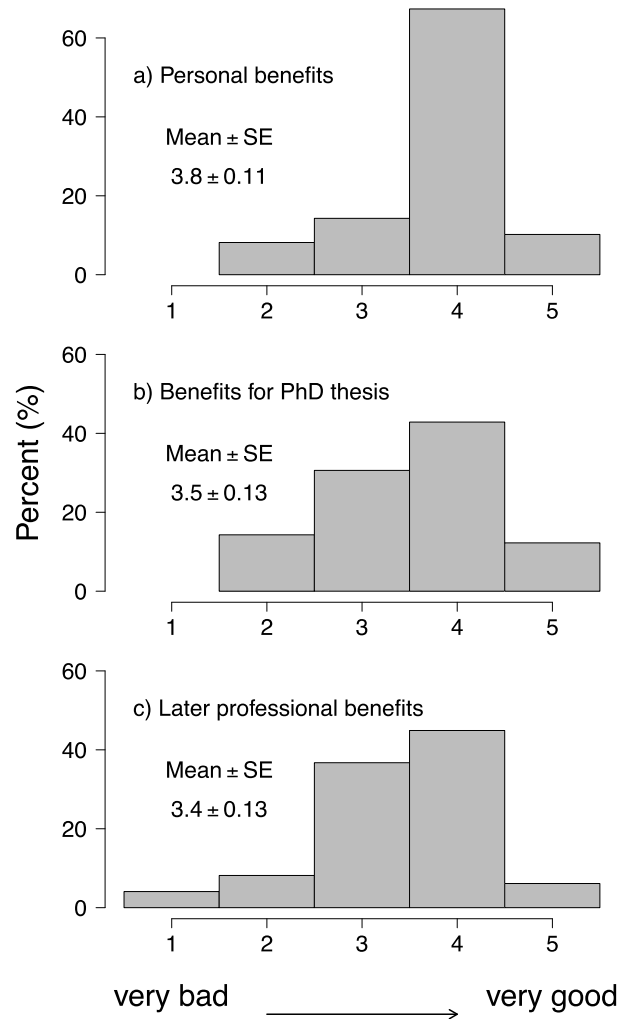


Figure 2: Q2: How would you rate the courses offered by the Graduate Program with regard to a) personal benefits, b) benefits for the PhD thesis, and c) later professional benefits? $n=49$. Numbers on the x-axis indicate ratings from 1 (very bad) to 5 (very good), with 2 (bad), 3 (satisfactory), 4 (good).

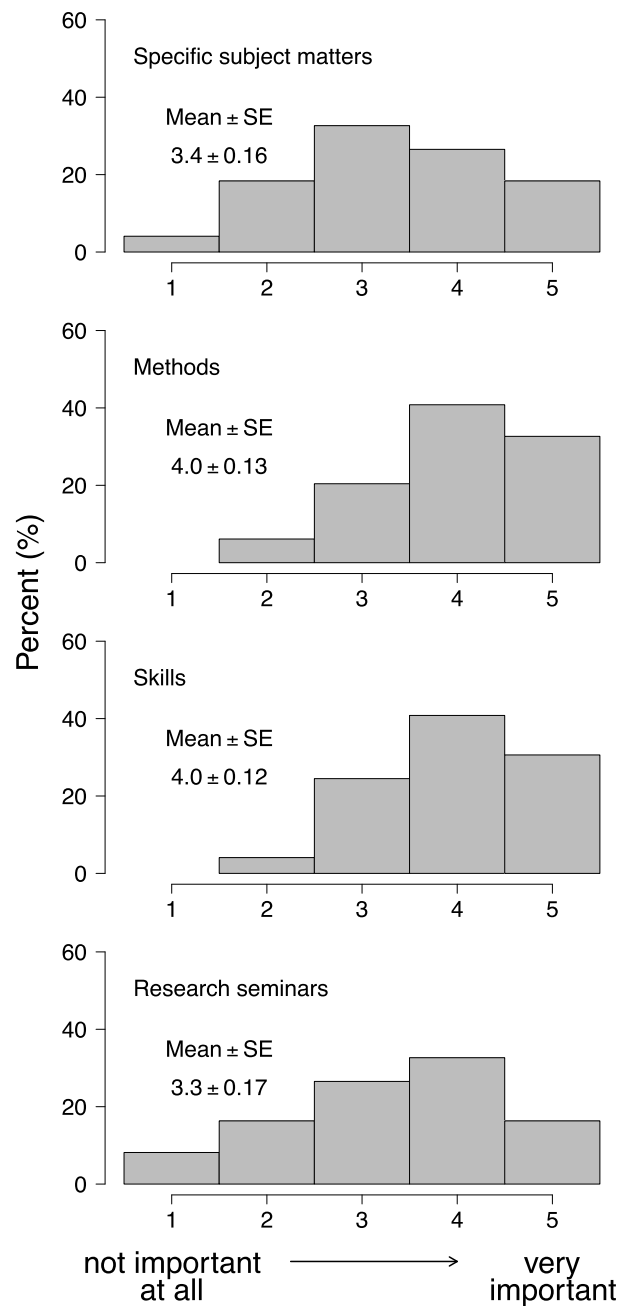


Figure 3: Q3: The course programme is structured into four modules. How important are these individual modules for you? $n=49$. Numbers on the x-axis indicate ratings from 1 (not important at all) to 5 (very important), with 2 (not important), 3 (satisfactory), 4 (important).



Figure 4: Rating of the four modules of the Graduate Program Ecology in 2001 ($n=22$) and 2009 ($n=49$). Numbers on the x-axis indicate ratings from 1 (not important at all) to 5 (very important), with 2 (not important), 3 (satisfactory), 4 (important). Error bars show standard errors of the mean.

Question 4–5: Most and least popular aspects of the programme. Among the popular qualities of the Graduate Program Ecology “The opportunity to learn methods essential for scientific work” was chosen most often, whereas “The structure of the programme (four modules)” was chosen least often (Fig. 5). Only three respondents chose the “Other” option (see Appendix A for answers), indicating that the eight answer categories offered were a good selection.

Although the structure of the programme was also chosen as a positive quality of the programme (see Fig. 5), it was the most disliked aspect among the choices offered (Fig. 6). Most students had hardly anything to criticize and were very satisfied with the programme. However, the “Other” option of Question 5 was chosen seven times, indicating that some aspects were missing from the answer categories offered. Four respondents criticized that some courses took place during the field season and therefore could not be taken (see Appendix A for all answers).

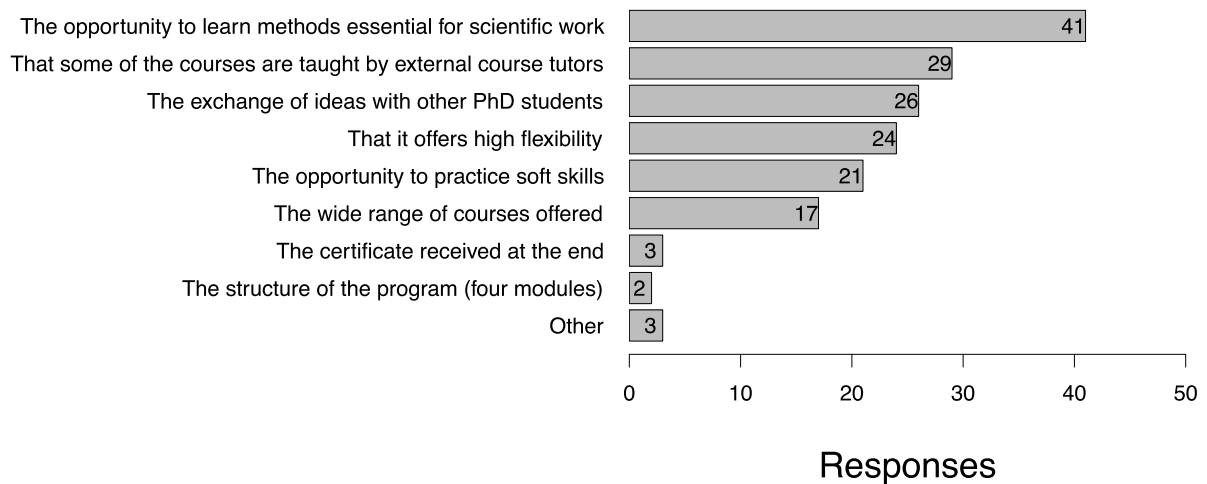


Figure 5: Q4: *What do you like in the Graduate Program Ecology?* (Multiple answers are possible). n=49. The number of responses is given on the x-axis and inside the bars.

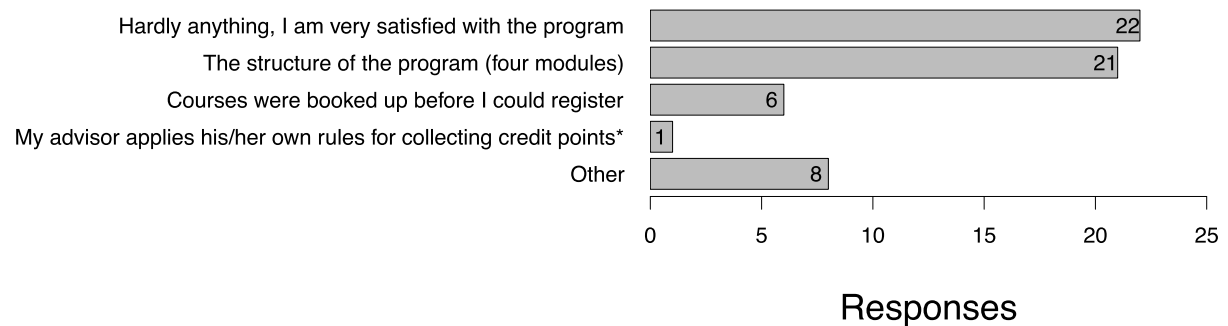


Figure 6: Q5: *What do you dislike in the Graduate Program Ecology?* (Multiple answers are possible). n=49. The number of responses is given on the x-axis and inside the bars.
*that differ from those by the Graduate Program Ecology

Question 6–7: Evaluation of courses. The courses taken most often, i.e., by more than 50% of the respondents were “Writing up scientific research” (*Skills*), “Statistics for free I: Linear Models in R” and “Statistics for free III: Generalized Linear Models in R” (*Methods*), “Presentation (talk, poster) in one of the seminars” (*Research seminars*), and “Journal club (seminar)” (*Specific subject matters*, see Fig. 7). The rating of courses gives a similar picture: courses rated higher than four (on a scale from 1–5) were: “Writing up scientific research”, “Study design and data analysis using the statistical software R” as well as “Statistics for free” I and III, and “Presentation (talk, poster) in one of the seminars” (Fig. 8). There was a significant rank correlation between the frequency of course visits and the average rating of the courses (Spearman’s $\rho=0.60$, $P<0.001$). Moreover, these results confirm those from the Evaluation in 2001 (Lindemann-Matthies 2001), where the six courses rated higher than four (also on a scale from 1–5) included four statistics courses, scientific writing practice, and writing scientific papers and proposals.

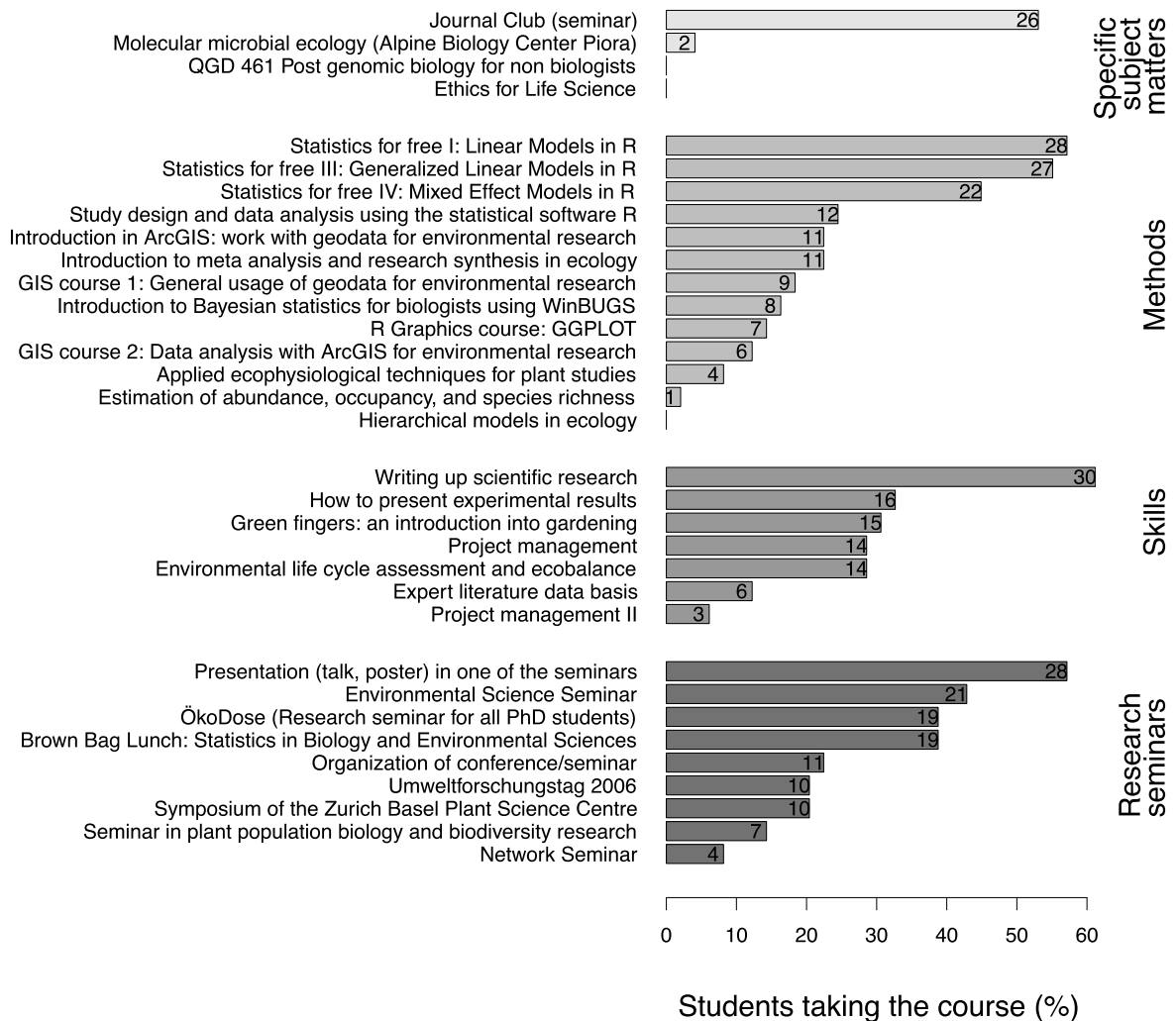


Figure 7: Q6: The following courses were offered by the Graduate Program Ecology between winter term 2005/2006 and autumn 2008. Please mark all courses you attended (and activities you participated in). n=49. The number of students that took the course is given inside the bars. Note that a minimum of three participants was required for a course to take place, i.e., numbers <3 indicate that not all students who participated in a course participated in this survey.

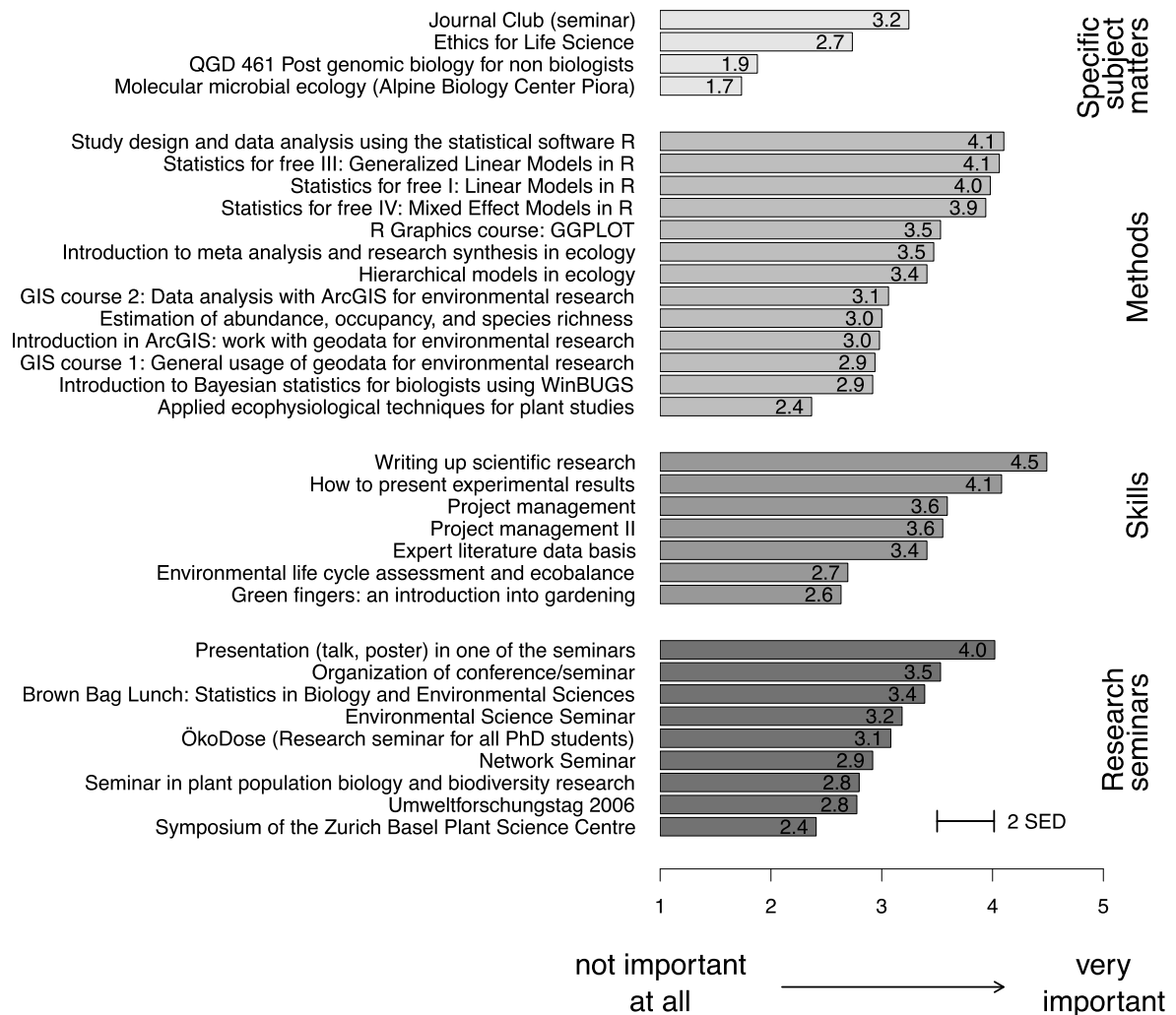


Figure 8: *Q7: The following courses were offered by the Graduate Program Ecology between winter term 2005/2006 and autumn 2008. Please rate all courses (taken and not taken) according to a potential benefit for you. n=49. Numbers on the x-axis and inside the bars indicate ratings from 1 (not important at all) to 5 (very important), with 2 (not important), 3 (undecided), 4 (important). The error bar shows 2 standard errors of the difference between means (SED).*

Question 8–9: How to improve the programme in the future. Twenty-three suggestions for improvements to the Graduate Program Ecology were made in response to *Q8: How could the Graduate Program Ecology be improved?* Twenty-three answers to this open question were categorized as shown in Table 2. Whereas the suggestions for improving the course programme are manifold, individual suggestions for improving the structure and timing of the programme point into the same direction. A more open structure of the programme would be preferred and the students were not very happy with the four modules. Moreover, courses offered in summer cause troubles for those doing extensive field work.

Most students preferred block courses over weekly courses, i.e., the statement *Q9 A: Block courses are generally better than weekly courses* received an average rating of 3.7 ± 0.17 , with ratings from 1 (strongly disagree) to 5 (strongly agree), with 2 (disagree), 3 (undecided), 4 (agree). However, they also agreed that some courses should be organized weekly, i.e., the statement *Q9 B: Some courses should be organized weekly (e.g. journal club, scientific writing)* received an average rating of 4.1 ± 0.15 (scale as above). Nine answers were given to the question *Q9 C: Should any courses be organized differently (block vs. weekly) to the way they are at present?* Four answers were in favour of block courses, two answers in favour of weekly courses (see Appendix A for exact answers). Whereas block courses in summer have the disadvantage that students are absent from field work for a whole week, weekly courses have the disadvantage that students with longer stays for fieldwork abroad cannot participate.

Students were rather satisfied with information available on courses from outside the Graduate Program Ecology (Fig. 9). However, this point may be further clarified in the guidelines of the Graduate Program Ecology.

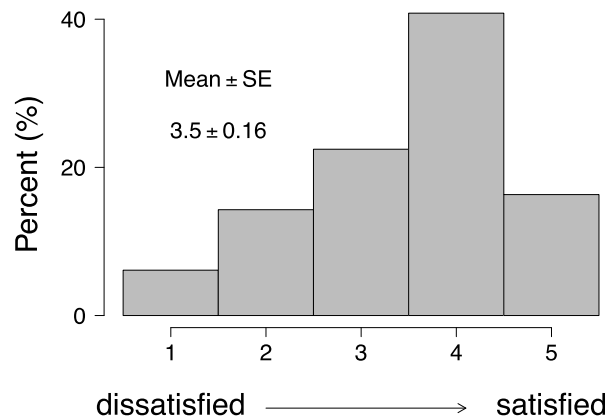


Figure 9: *Q10: Are you satisfied with information available on courses from **outside** the Graduate Program Ecology (e.g., from the 'PSC PhD Program in Plant Sciences' or the 'Life Science Zurich Graduate School')*. $n=49$. Numbers on the x-axis indicate ratings from 1 (dissatisfied) to 5 (satisfied), with 2 (rather dissatisfied), 3 (undecided), 4 (rather satisfied).

Table 2: Answers to Q8: *How could the Graduate Program Ecology be improved?*

<p>Improve the course programme (14 answers)</p> <p>More courses in <i>Specific subject matters</i> module</p> <ul style="list-style-type: none"> - Kursblock 1 mehr Angebote - wider range of courses on specific subject matters <p>More zoological courses</p> <ul style="list-style-type: none"> - I think the graduate program ecology is already very good! We just would need more courses dealing specifically with zoological subjects or a graduate program animal behaviour/organismic zoology. - It seems that there are already more courses than when I attended the GPE. It is very plant intensive. For me as a zoologist it would have been good to have more courses in this area. <p>Comments on statistics courses</p> <ul style="list-style-type: none"> - Statistics using other software than R - the “statistics for free” courses that base on one another should be offered more frequently (at least the “beginners” courses). <p>General ideas</p> <ul style="list-style-type: none"> - more practical field and laboratory courses - courses more prepared in advance and more organized - Wider range of choice. - Asking PhD’s and maybe Masters if they need a course that someone from other institutions can give it. <p>Courses already listed as potential new courses in Q11 or Q12</p> <ul style="list-style-type: none"> - A course on potential fundings for PostDocs, etc. - course about photography and graphic design (not just content is important) - see 5. [no training with focus on later professional work (Sustainability, Environmental Management System)] - more team building events
<p>Improve the structure of the programme (6 answers)</p> <ul style="list-style-type: none"> - The structure of the modules is not optimal. - structure of the courses makes little sense! Skill and methods do usually not differ fundamentally in their content - The description of the four modules and why they exist should be improved. It should also be stated somewhere in the Program leaflet, that courses can be organized by the students if there is a particular interest in a topic not offered yet. - better module definition - It would improve it a lot to remove the silly categories of SSM, M, S, and RS. I have talked to no-one that really understood the logic of which course is in what category and what it is good for. When you, like me, is in the field all summer, the choice of courses seemed limited, and it was stressful to try to get the right points in the right categories without knowing what would be offered the next winter semester. - a more open structure more exchange with other institutions and programs
<p>Improve the timing of courses (3 answers)</p> <ul style="list-style-type: none"> - I would try to offer courses (especially block courses) NOT during the field seasons, and have the most of the offer during the fall semester - I hope the same the course can be organized in different time of each year, otherwise people who have field work in the certain time of year cannot participate some courses over three years. - If dates for courses could be scheduled more in advance it would be easier to plan field studies, especially if working abroad.

Original terms of the statements were kept except for a few mistakes that hampered readability.

3.2 Future development of the Graduate Program Ecology

Question 11 and Delphi study: New courses. Among a choice of 26 courses that had been suggested during the interviews with students and faculty members, a course on “Writing a successful postdoc proposal” was chosen most often, followed by courses on “Ecological modelling”, “Databases” and “Ecological theory” (Fig. 10). Courses suggested under the “Other” choice were included in the next round where students were given a choice of 30 courses (26 old and 4 newly suggested ones), out of which they had to choose their three most favourite ones. The 11 courses most frequently chosen are shown in Fig. 11, the winners were “More advanced stats courses (e.g., lmer)”, “Ecological theory (adapted to PhD level)”, and “GIS-course with focus on ecological application”. When students were asked to rank these 11 courses (Fig. 12), the winners were “Ecological theory (adapted to PhD-level)”, “Writing a successful postdoc proposal”, and “More advanced stats courses (e.g., lmer)”. However, the ranking of the 11 courses was relatively even on average, with ranks ranging from 5.1–7.3.

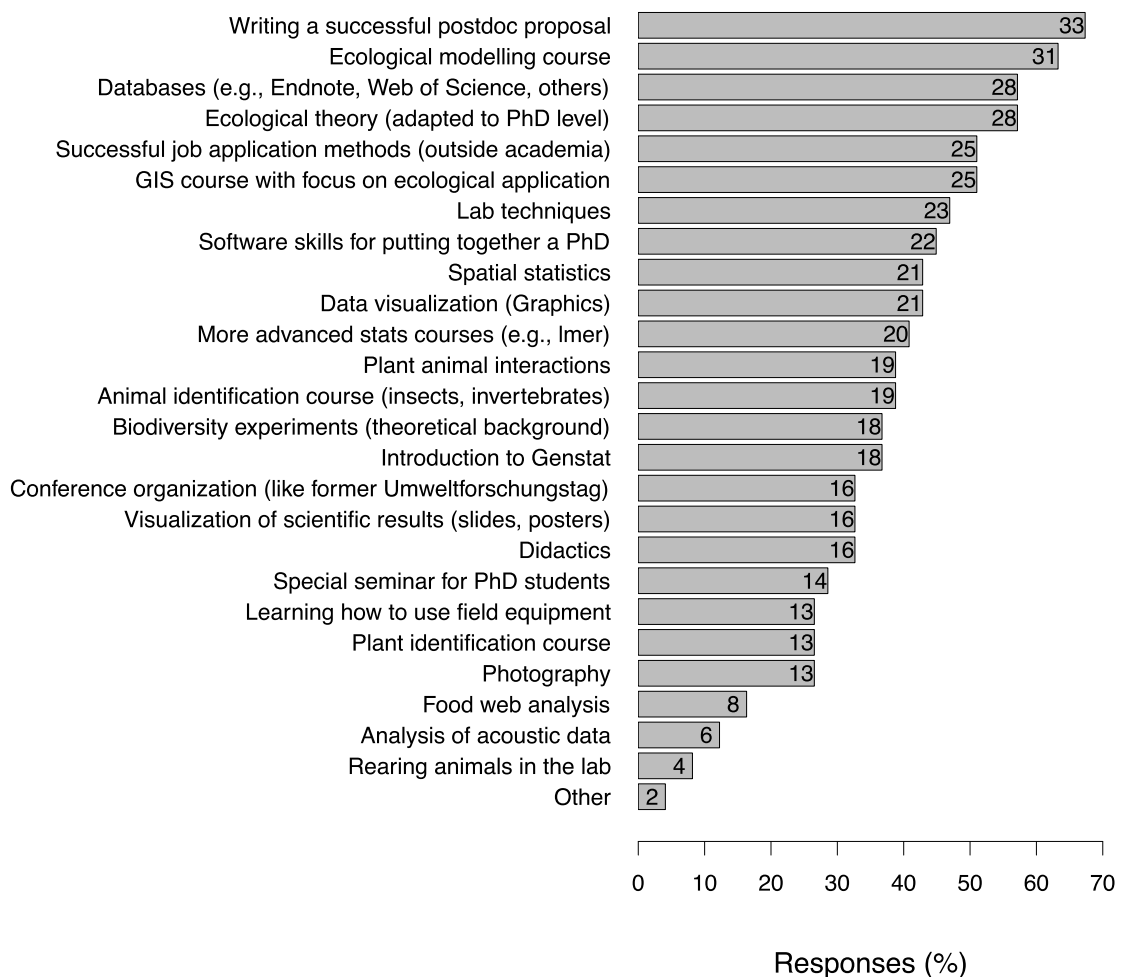


Figure 10: Q11: *What additional courses should be offered in future by the Graduate Program Ecology? (Multiple answers are possible).* n=49. The number of responses is given inside the bars. Note that this was a closed-ended question with a list of suggested courses and the possibility to suggest additional courses under “Other” .

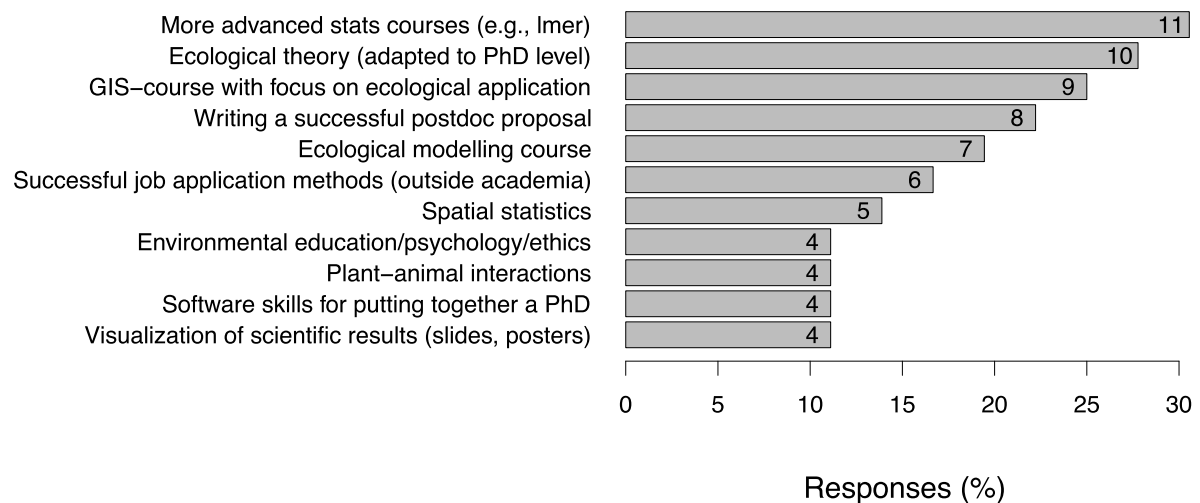


Figure 11: Delphi round 1: *Which three courses from the list below are your favourite ones and should be offered by the Graduate Program Ecology in the future? Please choose exactly THREE courses! (The list contains courses either suggested by students and faculty before or during our survey, where you were asked to add more courses.)* n=36. The number of responses is given inside the bars. Note that this figure shows the 11 courses chosen most frequently only.

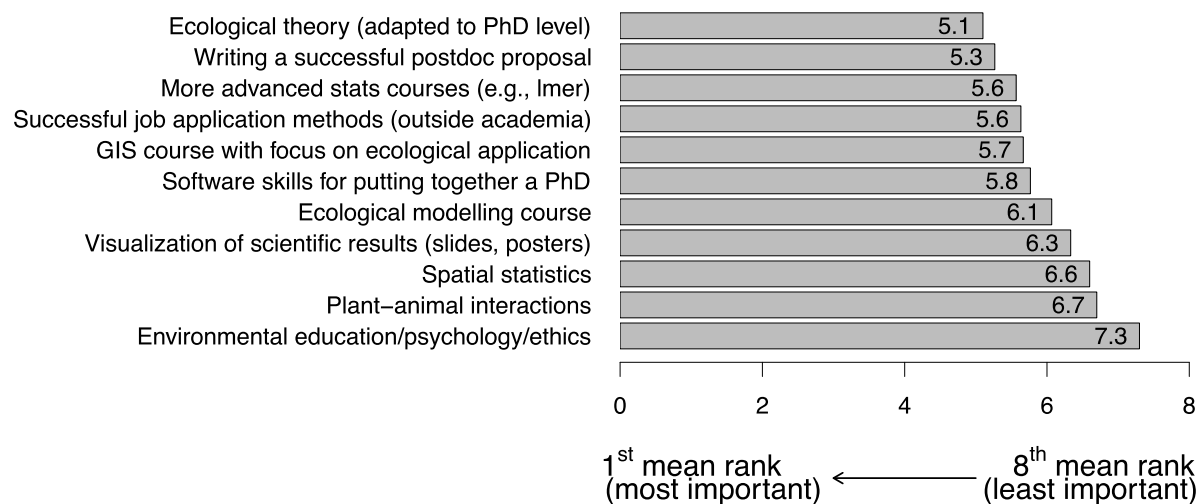


Figure 12: Delphi round 2: *How would you rank the 11 course topics in the list below according to your interest in taking such a course? (The list contains the 11 course topics chosen most frequently, i.e. ≥ 4 times, when active students in the programme were asked to choose their three most favourite ones out of 30 suggestions. The order of topics is randomized.)* n=30. Numbers on the x-axis and inside the bars indicate the mean rank assigned to each course topic.

Question 12: Courses outside the University. Among a choice of six types of courses that could be held outside the University, i.e., as weekends or even longer courses, field excursions and a summer school were considered as the most useful ones (Fig. 13). There were two suggestions made via the “other” option: a course on biological field methods (vegetation analysis, faunistic monitoring/field mapping) and their analysis and interpretation, and to organize the “summer school” in winter, because many PhD-students have field work in summer.

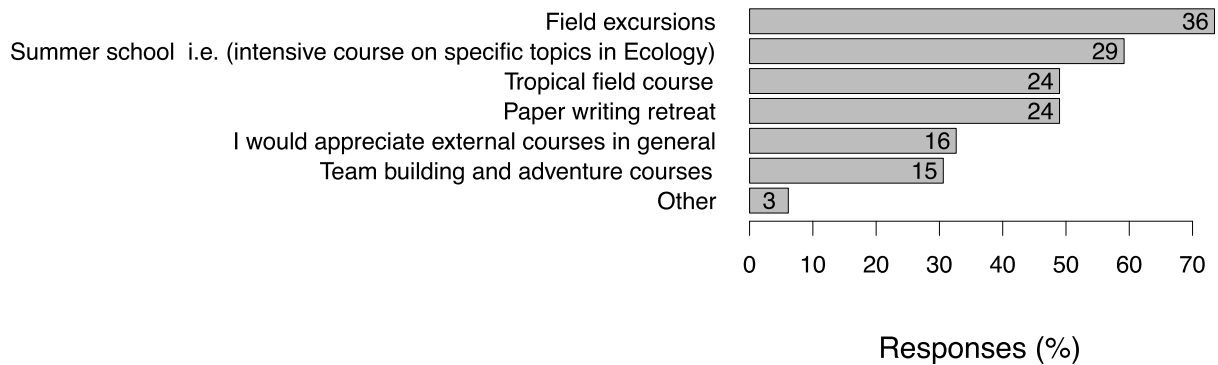


Figure 13: Q12: Some courses offered by the Graduate Program Ecology could be organized externally (weekends or one-week courses with overnight stay). What type of external courses would you find most useful? (Multiple answers are possible). n=49. The number of responses is given inside the bars.

Question 13: Course organization by students. Five students already organized a course of particular interest to themselves for the Graduate Program Ecology and another five would be interested in doing so (Fig. 14). As eleven students were not aware it is possible for students to organize a course, this option might be mentioned in the guidelines of the Graduate Program in the future.

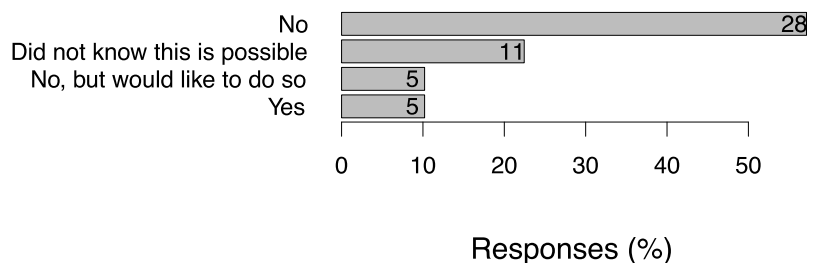


Figure 14: Q13: Have you ever actively participated by organizing a course of particular interest to you for the Graduate Program Ecology? n=49. The number of responses is given inside the bars.

Question 14: Other ideas. One particularly useful suggestion is that of introducing a so called “Götti-Gotte-system” in which each new student receives support and advice from an already experienced older student in the programme. Such a system is already implemented in the “Master in Environmental Sciences” which is also run by the Institute of Environmental Sciences. See Appendix A for all answers to Question 14.

3.3 The participants of the Graduate Program Ecology

Questions 15 and 16: Gender and age. Overall, 55.1 % of the 49 respondents were women (*Q15: Are you male/female?*). The gender proportion is rather constant for active students and students completing in 2007 and 2008 (Table 3). Respondents were 32 years old on average (median 32), the youngest being 24, the oldest 47 years old (*Q16: How old will you turn in 2009?*).

Table 3: Gender and age of the respondents.

	Respondents	Women		Men		Age [years]	
			%		%	Mean	Min/Max
Active students	33	18	54.5	15	45.5	31.5	(24,47)
Students 2007/08	16	9	56.3	7	43.7	33.2	(29,40)

Questions 17 and 18: Subjects and Institutes. The majority of students (32 out of 49) were doing a PhD in Ecology (Fig. 15). However, not all other subjects are as broad as Ecology, and several PhD topics may potentially fit into more than one category. Nevertheless, the frequent choice of Ecology shows identification with the field after which the graduate programme is named. As “Other” subjects Evolution (2 ×), Computational Science, Molecular Ecology, Climate change and Environmental impact assessment were mentioned.

Twenty-seven students were based at the Institute of Environmental Sciences that runs the Graduate Program Ecology (Fig. 15), followed by ten students from the Institute of Zoology (University of Zurich, UZH) and seven from the Institute of Integrative Biology (Swiss Federal Institute of Technology Zurich, ETHZ). Other institutes are: UFZ Halle, Germany; Institute of Systematic Botany (UZH); Institute of Plant Sciences (ETHZ).

Question 19: Start of the PhD. The group of active students in the Graduate Program Ecology seems to fall into two main subgroups: while at the time of this survey, many students are at an early stage of their PhD (most of them having started in 2008), also many students will probably finish their PhD soon (most of them having started in 2005). Students who completed their PhD in 2007 or 2008 had started mainly in 2003 and 2004.

Question 20: Finding a PhD position. Most of the respondents found their PhD position by applying for an advertised job or through personal contacts (Fig. 16).

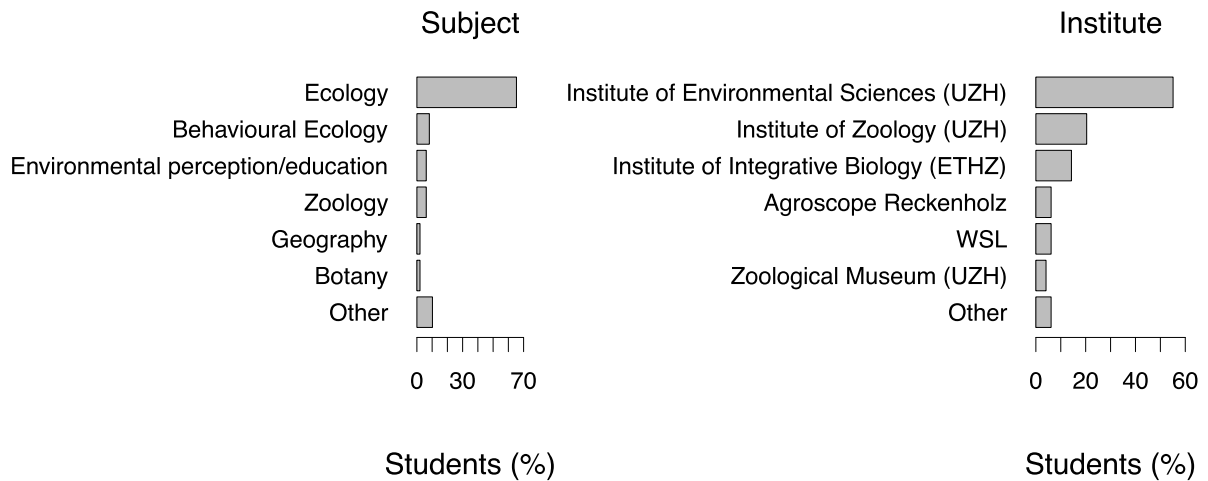


Figure 15: *Q17: What is your research field?* (left panel, $n=49$) and *Q18: At which Institute(s) do you work for your PhD? (Multiple answers are possible)* (right panel, $n=49$ students gave 55 answers). UZH: University of Zurich, ETHZ: Swiss Federal Institute of Technology Zurich, WSL: Swiss Federal Institute for Forest, Snow and Landscape Research.

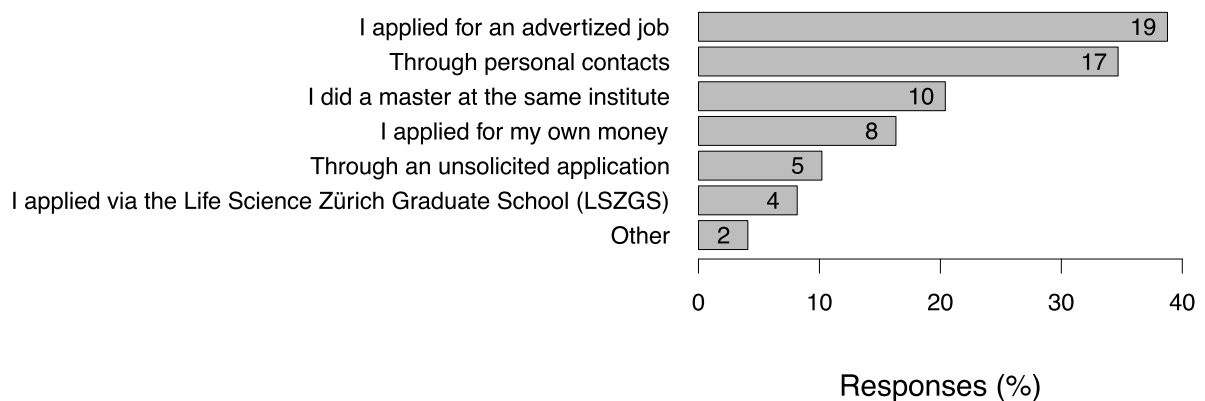


Figure 16: *Q20: How did you find your PhD position? (Multiple answers are possible)*. $n=49$ students gave 65 responses. The number of responses is given inside the bars. The two responses given in the “Other” category were: “It was offered to me” and “Other”.

Question 21: Funding. Most of the respondents (79.6%) were employed on third party money, the others on institute funds (*Q21: Are you employed on Institute funds/Third party money (e.g., SNF and others)*).

Questions 22 and 23: Choice of the Graduate Program Ecology. Most of the respondents heard about the Graduate Program Ecology through their thesis advisors (49.0%) or through other PhD students (36.7%). Some students knew about it through the Life Science Zurich Graduate School (10.2%) or because they did an MSc at the Institute of Environmental Sciences IES (4.1%, *Q22: How did you hear about the Graduate Program Ecology?*). The two most important reasons to register for the programme are (1) that all PhD students at the Institute participate (true for IES) and (2) the good

course programme (Fig. 17).

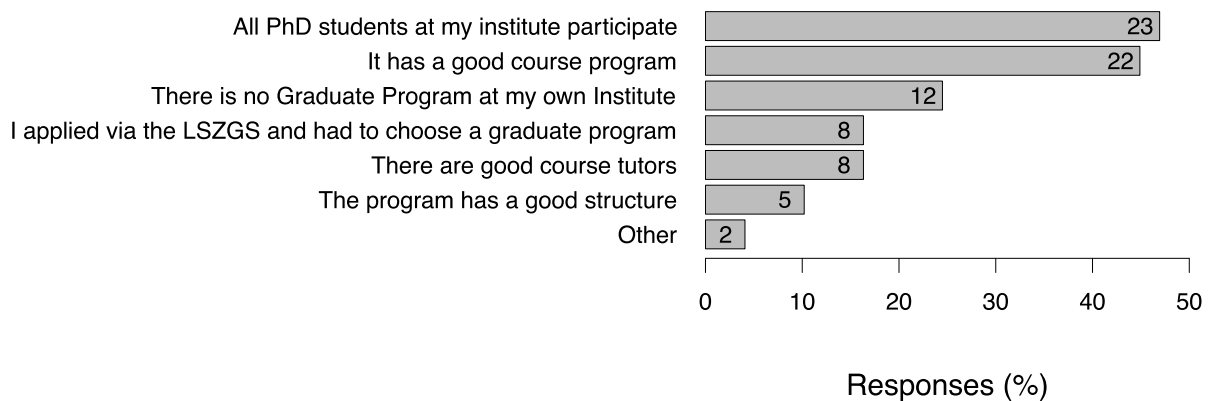


Figure 17: Q23: *Why did you register for the Graduate Program Ecology?* (Multiple answers are possible). $n=49$. The number of responses is given inside the bars.

Question 24: Scientific output of the respondents. Whereas only 33.3% of the active students in the Graduate Program Ecology had already published a first-author paper from their PhD, 75.0% of the students who had completed their PhD in 2007 or 2008 had done so (see Fig. 18 for more details). This shows that most papers are published towards the end or even after finishing a PhD.

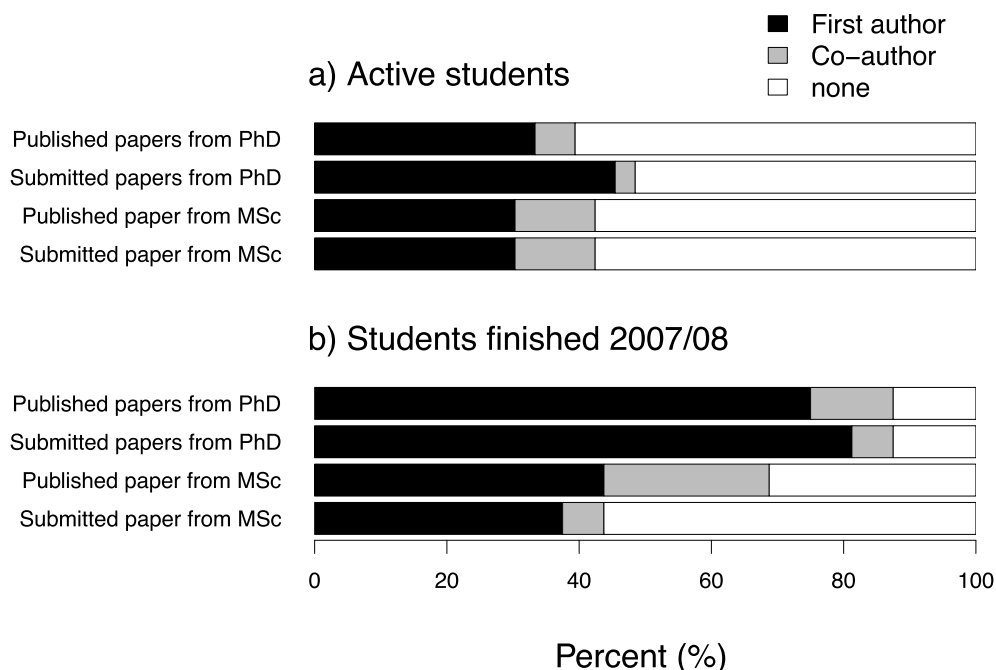


Figure 18: Q24: *Did you already publish parts of your scientific work in a peer-reviewed journal?* $n=49$.

3.4 The role of the Life Science Zurich Graduate School

Since the application process via the Life Science Zurich Graduate School (LSZGS) is rather new, only eight of the active students had applied for the Graduate Program Ecology (and a PhD position) via LSZGS. These students valued the LSZGS as a way to recruit students significantly higher than other students ($\chi^2_{3,35} = 9.1$, $P < 0.05$, Fig. 19). A PhD committee was generally preferred over a single PhD advisor (Fig. 20).

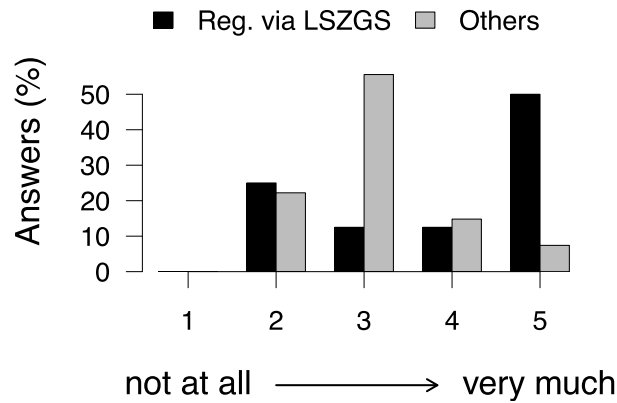


Figure 19: Q25: Please answer these questions if you applied via the Life Science Zurich Graduate School (LSZGS). Do you think the LSZGS is a good way for recruiting PhD students? Black bars: students who applied via LSZGS (Q23, n=8). Gray bars: other students who answered Q25 (though not asked to do so, n=27). Numbers on the x-axis indicate ratings from 1 (not at all) to 5 (very much), with 2 (no), 3 (undecided), 4 (yes).

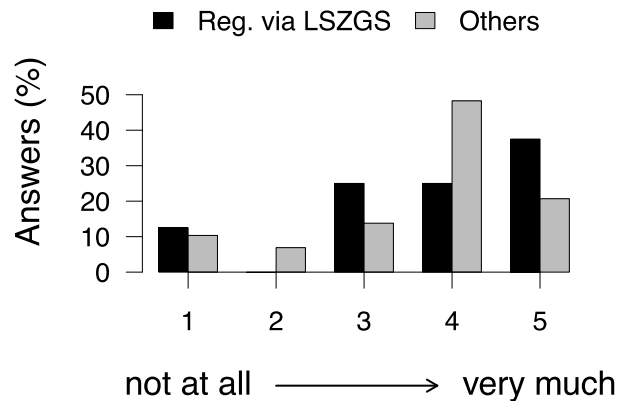


Figure 20: Q25: Please answer these questions if you applied via the Life Science Zurich Graduate School (LSZGS). Do you prefer having a PhD committee rather than a single PhD advisor? Black bars: students who applied via LSZGS (Q23, n=8). Gray bars: other students who answered Q25 (though not asked to do so, n=29). Numbers on the x-axis indicate ratings from 1 (not at all) to 5 (very much), with 2 (no), 3 (undecided), 4 (yes).

4 Results Survey 2—Former students

4.1 Evaluation of the Graduate Program Ecology in retrospective

Question 1: PhD students or postdocs? In the pilot phase of the Graduate Program Ecology, it was also possible for postdocs to participate. However, almost all former students who responded to Survey 2 (n=43) participated as PhD students (n=41 or 95.3%, see *Q2.1: Did you participate in the Graduate Program Ecology as a PhD student/Postdoc/Other?*). One person participated as PhD student and postdoc, one as postdoc only, and one studied in the “Nebenfach Umweltwissenschaften”.

Questions 2–4: Courses best remembered, most useful, or missing. Two types of courses from the Graduate Program Ecology were at the same time best remembered and considered most useful by the respondents: Statistics courses (various ones) and Scientific writing (Fig. 21). There is a strikingly good rank correlation between courses remembered and courses considered most useful (Spearman’s $\rho=0.85$, $P<0.001$).

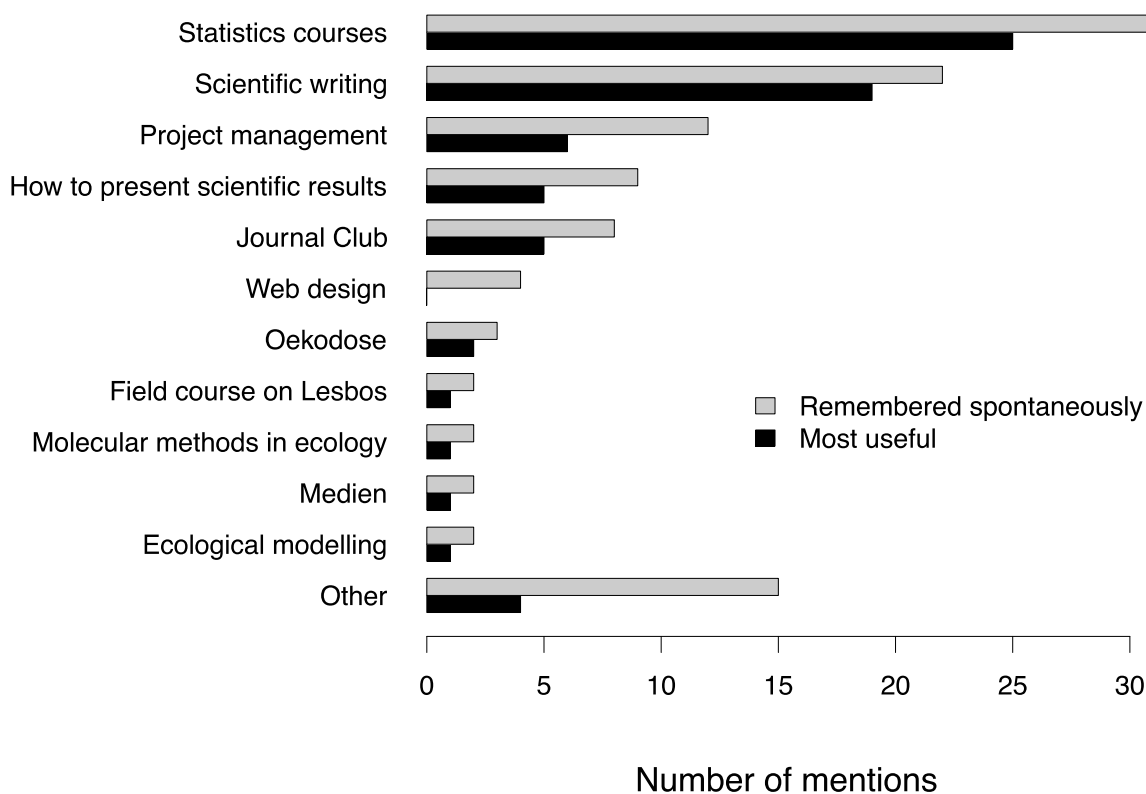


Figure 21: *Q2.2: Which courses do you remember spontaneously from the Graduate Program Ecology?* (Gray bars, n=43 responses including 112 courses). *Q2.3: Which courses from the Graduate Program Ecology proved most useful for you? If possible, specify whether the course was useful during the PhD or later in your professional life* (Black bars, n=43 responses including 70 courses). Note that both questions were open questions. Answers to Q2.2 were first grouped as shown in this Figure, then answers to Q2.3 were grouped the same way.

Most students ($n=21$ or 48.8%) did not specify any course they found lacking in the programme. Courses that were not offered but would have been useful for their professional life today were grouped as shown in Table 4. It is interesting to note that GIS courses and Project management later became part of the course programme, whereas “Ecological modelling” and “Writing proposals” did not, but are among the most wanted courses to be offered in the future (Fig. 14). A demand to prepare for “Life after the PhD” is also reflected by the designated courses “Successful job application methods (outside academia)” and again, “Writing proposals” (see also Fig. 14). However, in addition to that, there seems to be a desire for reflection on what comes after a PhD (see Appendix B). Moreover, the “Other” category is important here, as together with “Life after the PhD”, it includes several potential *Skills* courses that should be important in the non-academic, but also in the academic job market. The list includes topics such as leadership, time management, and negotiation practice.

4.2 Scientific output of the respondents

Before defending their PhD thesis, 57.1% of the respondents had published at least one paper and 92.9% eventually published at least one paper from their thesis as first author, i.e., either before or sometime after defending the thesis (Fig. 22). Co-authored papers were less common than first author papers from a PhD. Before defending their PhD thesis, 35.7% were co-author on at least one published paper and 57.1% were eventually co-author on at least one paper. Hereby, some of the respondents who were never co-author of a paper after the defence were co-authors of a paper before the defence and vice versa.

It is interesting to note that neither the number of first author papers published before nor after the defence was related to whether someone stayed in academia or not (see also Q2.10 b), $\chi_{4,33}^2=1.37$, $P=0.96$, $\chi_{4,33}^2=5.35$, $P=0.27$, respectively).

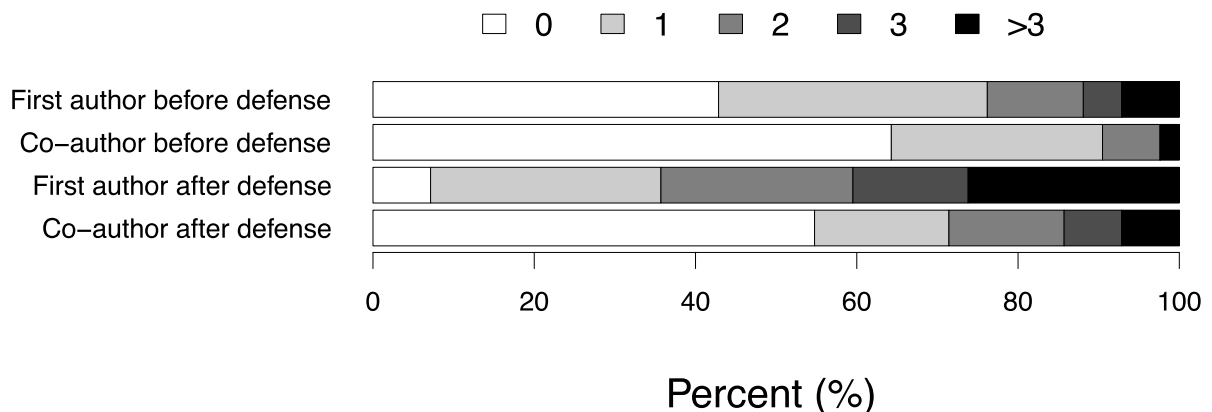


Figure 22: Q2.5: How many peer-reviewed papers from your PhD were published? $n=42$.

Table 4: Q2.4: Was there any course that was not included in the graduate programme (at that time) that would have been very valuable for your personal life today?

Life after the PhD (5 answers)
<ul style="list-style-type: none"> - After my PhD I worked for 2 years in an applied research institute. During this time I was often the head of meetings or had other managerial functions. And for this kind of work I was not prepared (but it is of course likely that after a PhD one has to do such kind of work) - so courses in the field of leading people would probably be valuable towards the end of a PhD. (Such courses would also be valuable when continuing a scientific career). - A course for the “after PhD life”, for example to prepare an application dossier and to know what kind of salary we can ask as Dr., it could be really useful - Not really a course. I missed critical discussions with my supervisors (to a lower extent, also with colleagues) about my future, to get some distance with my PhD. A PhD is a great personal experience that changes our future life. Getting some distances may help those who embrace a scientific career (long-term objectives, not short-term projects decided by the supervisors) or those who quit basic science (getting more confident in our abilities, perspectives in private companies or public institutions outside research). - A course preparing me for the specifics of an academic career - maybe: a course how to run an own company
Ecological modelling (3 answers)
<ul style="list-style-type: none"> - A course on modelling might have been useful - A course on phylogenetic approaches in ecology maybe too. - A biological/mathematical modeling course, the one offered [...] was not very useful and in depth. A more theoretical course of ecology. - I would have been interested by a course on modelling and a course on GIS
Writing proposals (3 answers)
<ul style="list-style-type: none"> - something that has to do with reviewing and editing of manuscripts for scientific journals. project proposal writing and background in acquiring project grants. - Scientific writing (manuscripts). Proposal writing - Grant application writing
GIS (2 answers)
<ul style="list-style-type: none"> - I would have liked a course on GIS methods - I would have been interested by a course on modelling and a course on GIS
Project management (2 answers)
<ul style="list-style-type: none"> - Project planning - project management
Other ¹ (8 answers)
<ul style="list-style-type: none"> - Difficult to say, because I'm not longer working as a biologist. Anyway, the journal club helped me “open my mind” and it is always useful in life. - A course on generalized linear mixed models for non-normal data. - Advanced Excel application - Webdesign - economy (BWL) - skills: time management science: interdisciplinary brush-up courses on evolutionary theories (speciation, evolution of life-history traits) with zoologists & taxonomists science: interdisciplinary brush-up courses for ecologists on recent findings in plant biology on genetic mechanisms determining phenotypic traits - bioinformatics would have been very useful, and I think it is a rising field that ecologists have growing interest in - Negotiation Praxis (did that in the Mentoring UMFRAUEN)

¹ Courses that were mentioned only once.

Original terms of the statements were kept except for a few mistakes that hampered readability.

4.3 The former students in the Graduate Program Ecology

Questions 6 and 7: Subjects and institutes. A majority of the former students (25 out of 40) were doing a PhD in ecology (Fig. 23, left panel), as did the majority of active students (Fig. 15). Likewise, the majority of students (18) were based at the Institute of Environmental Sciences that runs the Graduate Program Ecology (Fig. 23, right panel), followed by students from the Institute of Zoology (University of Zurich, UZH) and from WSL (Swiss Federal Institute of Forest, Snow and Landscape research).

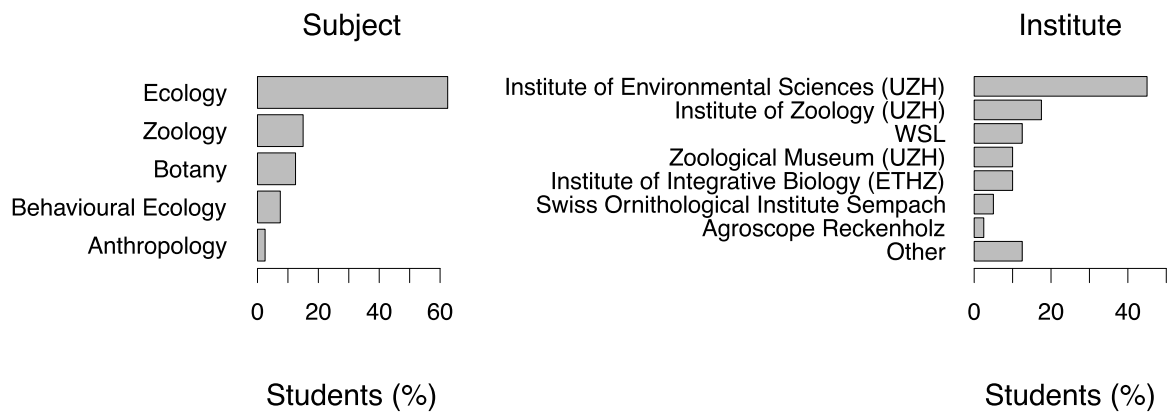


Figure 23: Q2.6: *What was your research field during your PhD?* (left panel, $n=40$) and Q2.7: *At which Institute(s) did you work for your PhD? (Multiple answers are possible)* (right panel, $n=40$ students gave 46 answers). For Q6: The “other” option is ignored here, since only more detailed subject descriptions were specified rather than any new subject category. UZH: University of Zurich, ETHZ: Swiss Federal Institute of Technology Zurich, WSL: Swiss Federal Institute for Forest, Snow and Landscape Research.

Other institutes were: “Institute of Systematic Botany (UZH)”, “Anthropological Institute (UZH)”, “MPI-BGC, Jena, Institute for Ecology, University of Jena (D)”, and “Max-Planck Institut für Vogelforschung, Vogelwarte Radolfzell (D)”.

Questions 8 and 9: Time of defence and duration of PhD. The number of PhD theses finished per year was not constant for the respondents of Survey 2. Rather, the defences clump in certain years (i.e., 2002, 2004, 2006, and 2007, Fig. 24, left panel). The duration of a PhD shows large variation with a minimum of one year and nine months and a maximum of five years and two months (Fig. 24, right panel).

Questions 10 and 11: Postdoc years and current occupation. Most former students did a postdoc after their PhD ($n=29$ or 67.4% specified how many years) and 24 were still working in academia at the time surveyed (Table 5). Ten students did not answer Q2.10. Out of those, seven did not work in academia anymore, as judged by their current occupations specified in Q2.11. The remaining three did not specify their current occupation, but it is reasonable to assume that they too were no longer working in academia.

Most former students who are still in academia have temporary positions. The ones having a permanent job took an average of six years postdoc time. Former students who

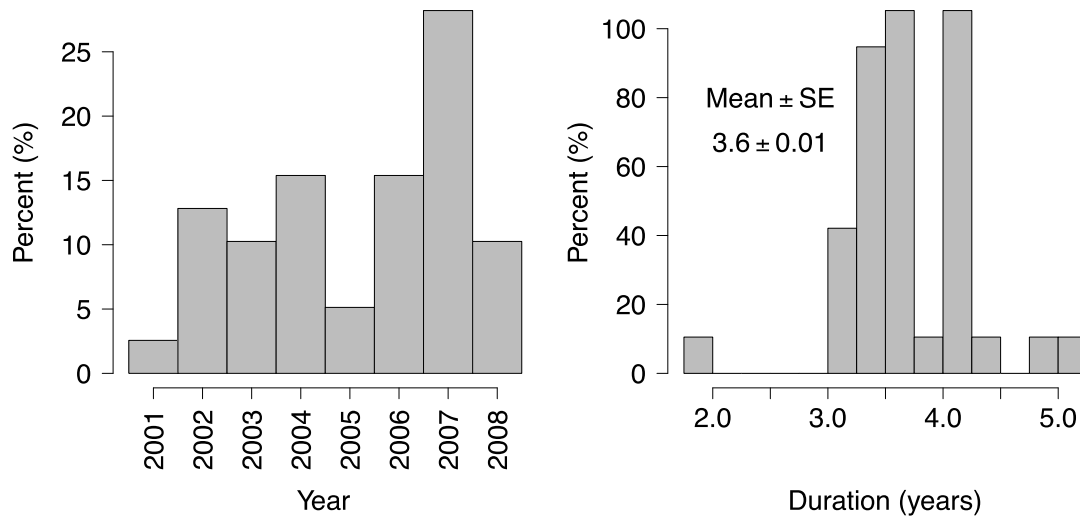


Figure 24: Q2.8: *When did you finish your PhD (the year of your defence)?* (left panel) and Q2.9: *How long did you take to complete your PhD (years and months until the time of your defence)?* (right panel). $n=40$ for Q2.8 and Q2.9.

Table 5: Q2.10: *Did you work as a postdoc after your PhD? (only yes answers please). a) For how many years?, b) Are you still in academia, c) Is your current position permanent or temporary?* $n=33$. The table shows years as a postdoc and numbers of former students in brackets.

	Still in academia	
	Yes	No
Permanent job	6.0 (6)	1.1 (5)
Temporary job	3.1 (18)	1.3 (2)
Total	3.8 (24)	1.2 (9)

stayed in academia had a significantly lower chance of having a permanent job than those who left academia (after having been a postdoc first, $\chi^2_{1,31}=5.10$, $P<0.05$).

The current jobs and employers of the respondents were categorized as shown in Fig. 25. In line with Q2.10, 60.5% of the former students are still doing research and 65.1% are employed by Universities or other research institutions (Federal research institutions or Swiss Ornithological Institute). However, not all jobs are easily classified as “research jobs” or not (see Appendix B for detailed answers).

Questions 12–14: Gender, children and mentoring. Twenty-three (53.5%) respondents were women, twenty (46.5%) were men. These proportions are very similar to those found for active students (Table 3).

A bit less than half of the respondents (47.5%) have children (Table 6). The number of children did not differ between men and women ($\chi^2_{3,40}=2.16$, $P=0.67$).

Fifteen respondents (34.9%) said that they participate(d) in a mentoring programme (Q2.14: *Do you/Did you participate in any mentoring program(s)? No/Yes/If yes, in*

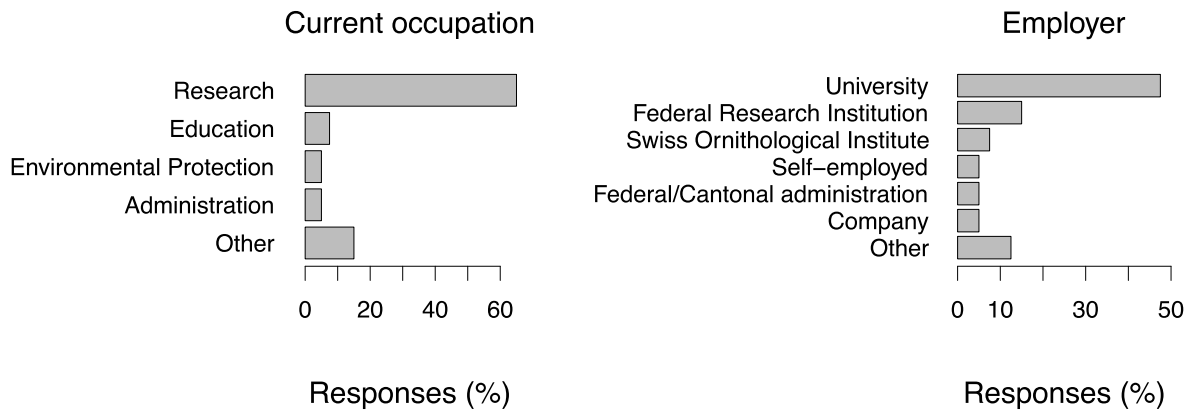


Figure 25: Q2.11: What is your current occupation? Please describe your job and where you are employed. n=40.

which program?). Thereof, 10 women were or had been members of the Umfrauen¹ and two were members of FrauSchafftWissen², both peer-mentoring groups for women that were still active at the time of this survey. None of the three men specified a mentoring program.

Table 6: Q2.13: Do you have children? n=40.

	Women		Men	
	Number	%	Number	%
No child	11	55	10	50
One child	3	15	6	30
Two children	5	25	4	20
More than two children	1	5	0	0

¹www.uwinst.uzh.ch/umfrauen

²www.wsl.ch/info/frauschafftwissen

5 Discussion & Outlook

The active and recent students in the Graduate Program Ecology rated the programme as good, in particular with regard to personal benefits. The direct benefits for the PhD thesis and for later professional life were rated as satisfactory to good. The *Methods* and *Skills* modules were considered as more important than *Specific subject matters* and *Research seminars*. These results are highly consistent with those from the evaluation in 2001 (Lindemann-Matthies 2001).

The more detailed evaluation of the course programme yielded one clear result: the courses on statistics and scientific writing are the indisputable strength of the Graduate Program Ecology. These courses were taken most frequently and their importance rated highest by active and recent students (Survey 1), as well as best remembered and considered most useful by former students retrospectively (Survey 2). Moreover, the evaluation of the course programme in 2001 yielded the same result. Performing statistical analyses and writing up scientific research into papers are key skills needed to successfully accomplish a PhD in ecology (in the broad sense), and to be a successful scientist in general. Other courses that belong to this category and were also considered very important, are courses on presenting scientific results and project management.

The Graduate Program Ecology currently distinguishes courses on *Methods* that can be of direct use in students PhD work, and *Skills* training courses that focus on preparing students for professional life, whether this be in an academic institution or not. Although the current strengths refer to both *Methods* (statistics) and *Skills* (scientific writing, presenting scientific results), these courses are of direct relevance primarily for completing a PhD and for doing science. Although a bit more than half of the former students were still in academia at the time surveyed, a considerable part entered the job market outside university. And indeed, several courses on *Skills* highly required and expected from academics entering the job market (BFS 2008, Schaeper and Briedis 2004), on topics such as leadership, time management, negotiation practice, running an own company, and project management, would have been desired by former students. Of course, most of these skills should also be useful for an academic career. The fact that the only course on one of these typical (soft) skills currently on the programme is “Project management”, identifies a gap in this array of courses. Besides the above mentioned skills, a course on “Successful job application methods (outside academia)” was on rank four of the designated courses by active and current students, and one of the former students would have found “A course for the ‘after PhD life’, for example to prepare an application dossier and to know what kind of salary we can ask as Dr.” very useful.

In general, the course programme could be improved with respect to structure and timing of the courses. A few students were unhappy with the organization of the programme in four modules and would prefer a more flexible structure. The students criticized that there were too few courses in the *Specific subject matters* module, and doubted that they would follow the current distinction of *Skills* and *Methods*. In fact, the above examples of statistics and scientific writing courses illustrate this point. With regard to timing, it was pointed out several times that courses could not be taken when offered during periods of field work (summer for most students).

As only eight active students had already applied for their PhD via the Life Science Zurich Graduate School, it may be too early to draw conclusions on the popularity of the LSZGS. However, most of these students thought the LSZGS was a good way to recruit students and also rated positively the requirement to have a PhD committee rather than a

single PhD advisor. Whereas the older generation of students was less enthusiastic about the LSZGS for recruiting students, they also preferred a PhD committee over a single PhD advisor.

Based on the evaluation of the current course programme and potential future courses, the following suggestions for the future can be made: firstly, responses of former as well as active and current students suggest that the current strengths of the course programme such as statistics and scientific writing courses should be maintained or even further developed. Maybe the well-known saying “I know that I know nothing” (attributed to the Greek philosopher Socrates) applies for the courses on statistics, and students with a reasonable level may be keener on additional courses than students with little knowledge. Two specific statistics courses and a GIS-course were among the 11 most wanted new courses selected by active and current students. Additionally, “Visualization of scientific results” was on this list, although a well rated course on presenting scientific results is already offered. For students aiming to stay in academia, a course on “Writing a successful postdoc proposal” would complete their training. Secondly, former students retrospectively would have profited from more courses that train *Skills* required in later professional life (see above). Thus, courses on (soft) skills like leadership, time management, and negotiation practice should be offered, and the course on project management should be kept. Thirdly, the choice of courses offered in the *Specific subject matters* module could be improved by adding courses such as “Ecological theory”, “Ecological modelling”, “Plant-animal interactions” and “Environmental education/psychology/ethics”. And lastly, the current structure of the Graduate Program Ecology with its four modules might be reconsidered.

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Appendix A

Full Answers to some questions from Survey 1

Question 4 (“Other” category)

Q4: What do you like in the Graduate Program Ecology? (Multiple answers are possible)

- that ecology also accepts non-ecology students in the program very flexibly
- Kontakt zur Praxis, Erfahrungen aus der Praxis, Verbindung von Praxis und Forschung
- more team building events

Question 5 (“Other” category)

Q5: What do you dislike in the Graduate Program Ecology? (Multiple answers are possible)

- but sometimes the courses are on a bad time for ecologists (i.e. during the field season)
- some courses were offered always in the same semester and could not be attended because of fieldwork
- Courses coincide frequently with field trips, making it difficult to attend those which I find important for me
- many courses take place during summer semester (field season) and some courses offered during the winter semester base on courses of the summer (field season again)
- no training with focus on later professional work (Sustainability, Environmental Management System)
- I would have liked a wider range of courses. Moreover, some courses were only in German and therefore English-speaking people could not attend.
- Most students' committees are dominated by professors that are all friends and therefore are not objective when conflicts occur between student and committee members.

Question 9C (all answers)

Q9: Do you prefer block courses or weekly courses? C: Should any courses be organized differently (block vs. weekly) to the way they are at present?

In favour of weekly courses

- Some statistics courses would benefit from being held weekly, to allow time to assimilate the material; this is sometimes too intense in one block course
- Only I would say Journal club to be given weekly

In favour of block courses

- yes more block courses
- I liked the block course in statistics..
- I could not attend any weekly courses because of field work abroad
- I generally prefer block courses because I prefer to concentrate on only one thing a day. But the biggest advantage is that there is (almost) no homework. For the weekly courses there were always lots to prepare and the credit points do never nearly reflect the work needed for a weekly course compared to a block course. I think this bias in work-load per credit point should be changed.

Other

- GIS course could be more intensive
- for me it would be better if block courses take place during winter semester while weekly courses should rather take place during summer semester (field season where I cannot be absent from the field for a whole week)
- no.

Question 14 (all answers)

Q14: Do you have any other ideas how to enrich the Graduate Program Ecology?.

General answers

- As the European style is quite different than American style, I would suggest that using American/Canadian professors for some courses.
- Accept credits and courses from other programs to broaden the topics
- A Götti-Gotte-system would be good. Every new student would have an older student who helps him to get started with organizing his/her PhD (more the things around the project than the project itself, like taking courses, registering at University).

Course programme

- we could have more courses on ecophysiological research.
- siehe 8., sonst war's gut [Kursblock 1 mehr Angebote]
- see 5. [no training with focus on later professional work (Sustainability, Environmental Management System)]

Appendix B

Full Answers to some questions from Survey 2

Question 11

Q2.11: What is your current occupation? Please describe your job and where you are employed.

Still in academia (answer to Q2.10 b)

1. head of research team ALPINE ECOSYSTEMS at WSL
2. coordinator and research assistant
3. postdoc in soil-plant interaction at WSL
4. I am a junior group leader (Oberassistent) in the Plant Ecology group at the University of Bern
5. Postdoc
6. Assistant, Institute of Animal Ecology, Justus Liebig University Giessen, Germany
7. I am postdoc at the Institute of Ecology and Evolution, University of Bern. I am currently planning my own research, supervising master students and bachelor students, and I am involved in teaching at the university.
8. prof. University of Potsdam
9. 50%: scientific assistant at the Swiss Ornithological Institute, Sempach. Data analyses, ornithological and ecological research, statistical consulting 20-40
10. Scientist, South African National Biodiversity Institute, South Africa
11. I am currently a post doctoral fellow at Swiss Federal Institute for Forest, Snow and Landscape Research WSL
12. Coordination/Management of the Zurich-Basel Plant Science Center
13. Lecturer at Department of Botany, Jomo Kenyatta University, Kenya. Teaching undergraduate and postgraduate courses. Supervising projects undergraduate and postgraduate courses. Doing some administrative duties.
14. Oberassistent' at the Institute of Zoology UZH, moving to ETHZ as a 'Förderungsprofessor' later this year.
15. SNF Ambizione grant, ETH Zurich
16. I have a mixed pos-doctoral fellow from the Portuguese Science foundation in collaboration with IFREMER in France. I am looking at dispersal and coevolution in deep sea organisms
17. Postdoc

18. Group leader 'Decision Analysis' at department of System Analysis, Integrated Assessment and Modelling (SIAM) of Eawag: Swiss Federal Institute of Aquatic Science and Technology.
19. Post doc
20. Post-doc researcher at the group of Prof. Rodolfo Dirzo at Dept. of Biology, Stanford University, USA. Working on plant-animal interactions on Mauritius, in South Africa and Mexico.
21. Assistent Zoologisches Institut, Universität Zürich
22. Post-Doc for Avian influenza at the Swiss ornithological institute
23. Post doc in theoretical evolutionary population biology at Stanford
24. Oberassistentin ETH Zürich

No longer in academia (answer to Q2.10 b)

- scientific collaborator in project management
- Data Analyst, Deltavista AG, Riesbachstrasse 161, 8034 Zürich
- Scientific project manager in the ecology research group of the Swiss Ornithological Institute
- educational projects in sustainability
- Contribution to ecological studies with various institutions. Contracts are usually for 2-3 months. Opportunities for future postdoc (University).
- baby break
- productmanagement
- freelancer in environmental education and admin job in backoffice
- I am a postdoctoral fellow at the Institute of Forest Genetics in Grosshansdorf (Germany) (federal research institute). I am working on population genetics and management of genetic resources in forest species.

No answer to Q2.10 b

- I have created a small firm and started a family.
- Faculty recruiting, Swiss Federal Institute of Technology
- Geschäftsstellenleiterin Naturzentrum Glarnerland (Stiftung für Naturpädagogik), www.naturzentrumglarnerland.ch.
- Gymnasiallehrer
- I'm working in the protection for air quality, at the federal office for the environment. I'm working with Emissions Database politic applications of the law.

- biologist of the “Fish and Wildlife Service” in the Kanton Aargau
- part time I give lectures at University. Most time I work for a small agency with topics of plant species protection, nature protection and ecological management

Three respondents did not specify their current occupation

Appendix C

Questionnaires

Survey questionnaire 1 – Active and recent students

Questionnaire Delphi round 1

Questionnaire Delphi round 2

Survey questionnaire 2 – Former students

Questionnaire for student interviews

Evaluation of the Graduate Program Ecology - January 2009

Welcome!

Dear participant of the Graduate Program Ecology

Ten years of experience provides us with a good opportunity to evaluate the Graduate Program Ecology and your satisfaction with the program. We are therefore very interested in your feedback, ideas, and answers to our questions.

Answering the questionnaire will take about 15 minutes.

Your cooperation will be very much appreciated!

Dr. Stefanie von Felten, Dr. Petra Lindemann-Matthies & Prof. Bernhard Schmid

Evaluation of the Graduate Program Ecology - January 2009

A. General evaluation of the current Graduate Program Ecology

1. How would you rate the current Graduate Program Ecology?

Overall rating	1 very bad	2	3	4	5 very good
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. How would you rate the courses offered by the Graduate Program with regard to

a) Personal benefits for you?	1 very bad	2	3	4	5 very good
b) Benefits for your PhD thesis?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Later professional benefits?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. The course program is structured into four modules. How important are these individual modules for you?

	1 not important at all	2	3	4	5 very important
Courses on specific subject matters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Courses on methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skills training courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research seminars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. What do you like in the Graduate Program Ecology? (Multiple answers are possible)

- The opportunity to practise soft skills
- The structure of the program (four modules)
- That it offers high flexibility
- That some of the courses are taught by external course tutors
- The exchange of ideas with other PhD students
- The opportunity to learn methods essential for scientific work (i.e., statistics, scientific writing, etc.)
- The wide range of courses offered
- The certificate received at the end
- Other (please specify)

5. What do you dislike in the Graduate Program Ecology? (Multiple answers are possible)

- Hardly anything, I am very satisfied with the program
- Courses were booked up before I could register
- My advisor applies his/her own rules for collecting credit points that differ from those by the Graduate Program Ecology
- The structure of the program (four modules)
- Other (please specify)

Evaluation of the Graduate Program Ecology - January 2009

6. The following courses were offered by the Graduate Program Ecology between winter term 2005/2006 and autumn 2008. Please mark all courses you attended (and activities you participated in).

SSM: courses on specific subject matters, M: courses on methods, S: skills training courses, RS: research seminars.

- SSM - Journal Club (seminar)
- SSM - Molecular microbial ecology (Alpine Biology Center Piora)
- SSM - Ethics for Life Science
- SSM - QGD 461 Post-genomic biology for "non"-biologists
- M - Statistics for free I: Linear Models in R
- M - Statistics for free III: Generalized Linear Models in R
- M - Statistics for free IV: Mixed Effect Models in R
- M - Introduction to Bayesian statistics for biologists using WinBUGS
- M - Study design and data analysis using the statistical software R
- M - Introduction to meta-analysis and research synthesis in ecology
- M - R Graphics course: GGPlot
- M - Hierarchical models in ecology
- M - Applied ecophysiological techniques for plant studies
- M - Estimation of abundance, occupancy, and species richness in large-scale surveys in ecology and monitoring (1-week course)
- M - GIS-course 1: General usage of geodata for environmental research (3 x 2 hours)
- M - GIS-course 2: Data-analysis with ArcGIS for environmental research (3 x 2 hours)
- M - Introduction in ArcGIS: work with geodata for environmental research (or: Einführung in ArcGIS im umweltrelevanten Arbeitsbereich, 2 days course)
- S - Environmental life cycle assessment and ecobalance
- S - Writing up scientific research
- S - Green fingers: an introduction into gardening (or: Der grüne Daumen)
- S - Ökobilanz
- S - How to present experimental results
- S - Project management (2-day course)
- S - Project management II (1-day course)
- S - Expert literature data basis
- RS - Environmental Science Seminar
- RS - Brown Bag Lunch: Statistics in Biology and Environmental Sciences
- RS - Seminar in plant population biology and biodiversity research
- RS - Network-Seminar
- RS - Symposium of the Zurich-Base! Plant Science Centre

Evaluation of the Graduate Program Ecology - January 2009

- RS - Umweltforschungstag 2006
- RS - ÖkoDose (Research seminar for all PhD students)
- RS - Organisation of conference / seminar
- RS - Presentation (talk, poster) in one of the seminars

7. The following courses were offered by the Graduate Program Ecology between winter term 2005/2006 and autumn 2008. Please rate all courses (taken and not taken) according to a potential benefit for you.

	1 not important at all	2	3	4	5 very important
Journal Club (seminar)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Molecular microbial ecology (Alpine Biology Center Piora)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethics for Life Science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
QGD 461 Post-genomic biology for "non"-biologists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Statistics for free I: Linear Models in R	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Statistics for free III: Generalized Linear Models in R	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Statistics for free IV: Mixed Effect Models in R	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduction to Bayesian statistics for biologists using WinBUGS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study design and data analysis using the statistical software R	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduction to meta-analysis and research synthesis in ecology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
R Graphics course: GGPlot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hierarchical models in ecology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applied ecophysiological techniques for plant studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estimation of abundance, occupancy, and species richness in large-scale surveys in ecology and monitoring (1-week course)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GIS-course 1: General usage of geodata for environmental research (3 x 2 hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GIS-course 2: Data-analysis with ArcGIS for environmental research (3 x 2 hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduction in ArcGIS: work with geodata for environmental research (or: Einführung in ArcGIS im umweltrelevanten Arbeitsbereich, 2 days course)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental life cycle assessment and ecobalance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing up scientific research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green fingers: an introduction into gardening (or: Der grüne Daumen)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ökobilanz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How to present experimental results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management (2-day course)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management II (1-day course)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expert literature data basis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental Science Seminar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brown Bag Lunch: Statistics in Biology and Environmental Sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seminar in plant population biology and biodiversity research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network-Seminar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Symposium of the Zurich-Base! Plant Science Centre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Umweltforschungstag 2006	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ÖkoDose (Research seminar for all PhD students)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organisation of conference / seminar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Evaluation of the Graduate Program Ecology - January 2009

Presentation (talk, poster) in one of the seminars

8. How could the Graduate Program Ecology be improved?

9. Do you prefer block courses or weekly courses?

1 strongly disagree 2 3 4 5 strongly agree

Block courses are generally better than weekly courses

Some courses should be organized weekly (e.g. journal club, scientific writing)

Should any courses be organized differently (block vs. weekly) to the way they are at present?

10. Are you satisfied with information available on courses from outside the Graduate Program Ecology (e.g., from the 'PSC PhD Program in Plant Sciences' or the 'Life Science Zurich Graduate School')?

1 dissatisfied 2 rather dissatisfied 3 4 rather satisfied 5 satisfied

I am

Evaluation of the Graduate Program Ecology - January 2009

B. Future development of the Graduate Program Ecology

11. What additional courses should be offered in future by the Graduate Program Ecology? (Multiple answers are possible)

- Spatial statistics
 - Photography
 - Conference organisation (like former Umweltforschungstag)
 - Special seminar for PhD students
 - More advanced stats courses (e.g., lmer)
 - GIS course with focus on ecological application
 - Writing a successful postdoc proposal
 - Animal identification course (Insects, Invertebrates)
 - Ecological theory (adapted to PhD level)
 - Analysis of acoustic data
 - Learning how to use field equipment
 - Didactic
 - Food web analysis
 - Introduction to Genstat
 - Plant identification course
 - Successful job application methods (outside academia)
 - Databases (e.g., Endnote, Web of Science, others)
 - Rearing animals in the lab
 - Visualisation of scientific results (slides, posters)
 - Lab techniques
 - Software skills for putting together a PhD
 - Plant-animal interactions
 - Ecological modelling course
 - Biodiversity experiments (theoretical background)
 - Data visualization (Graphics)
 - Other (please specify)
-

Evaluation of the Graduate Program Ecology - January 2009

12. Some courses offered by the Graduate Program Ecology could be organised externally (weekends or one-week courses with overnight stay). What type of external courses would you find most useful? (Multiple answers are possible)

- Paper writing retreat
- I would appreciate external courses in general
- Team building and adventure courses
- Tropical field course
- Summer school (i.e., intensive course on specific topics in Ecology)
- Field excursions
- Other (please specify)

13. Have you ever actively participated by organizing a course of particular interest to you for the Graduate Program Ecology?

- yes
- no
- did not know this is possible
- no, but would like to do so

14. Do you have any other ideas how to enrich the Graduate Program Ecology?

Evaluation of the Graduate Program Ecology - January 2009

C. Information on the participants in the Graduate Program Ecology

Of course, all information will be treated confidentially.

15. Are you

- female
- male

16. How old will you turn in 2009?

(in years)

17. What is your research field?

- Anthropology
- Behavioural Ecology
- Botany
- Ecology
- Environmental perception/education
- Geography
- Zoology
- Other (please specify)

18. At which Institute(s) do you work for your PhD? (Multiple answers are possible)

- Agroscope Reckenholz
- Institute of Environmental Sciences (UZH)
- Institute of Integrative Biology (ETHZ)
- Institute of Terrestrial Ecology (ETHZ)
- Institute of Terrestrial Ecosystems (ETHZ)
- Institute of Zoology (UZH)
- Swiss Federal Institute for Forest, Snow and Landscape Research WSL
- Swiss Ornithological Institute Sempach
- Zoological Museum (UZH)
- Other (please specify)

19. When did you start your PhD thesis (give month and year)?

Evaluation of the Graduate Program Ecology - January 2009

20. How did you find your PhD position? (Multiple answers are possible)

- I applied for an advertised job
 I applied for my own money
 I applied via the Life Science Zürich Graduate School (LSZGS)
 I did a master at the same institute before being taken as a PhD student
 Through an unsolicited application
 Through personal contacts
 Other (please specify) _____

21. Are you employed on

- Institute funds
 Third party money (e.g., SNF and others)

22. How did you hear about the Graduate Program Ecology?

- Through my thesis advisor
 Through other PhD students
 Through the Life Science Zürich Graduate School
 Other (please specify) _____

23. Why did you register for the Graduate Program Ecology? (Multiple answers are possible)

- It has a good course program
 All PhD students at my Institute participate
 I applied via the Life Science Zürich Graduate School (LSZGS) and had to choose a graduate program
 The program has a good structure
 There are good course tutors
 There is no Graduate Program at my own Institute
 Other (please specify) _____

24. Did you already publish parts of your scientific work in a peer-reviewed journal?

- | | yes, as first author | yes, as co-author | no |
|--|-----------------------|-----------------------|-----------------------|
| I submitted my master thesis for publication | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I published my master thesis | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I submitted one or more papers from my PhD for publication | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I published one or more papers from my PhD | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Evaluation of the Graduate Program Ecology - January 2009

D. For applicants via the Life Science Zürich Graduate School

25. Please answer these questions if you applied via the Life Science Zürich Graduate School (LSZGS).

- Do you think the LSZGS is a good way for recruiting PhD students?
 Do you prefer having a PhD committee rather than a single PhD advisor?
- | 1 not at all | 2 | 3 | 4 | 5 very much |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

New courses for the Graduate Program Ecology

Welcome!

Dear participant of the Graduate Program Ecology

This is a follow-up of our survey to evaluate the Graduate Program Ecology. We wish to find out which 10 new courses would be most favoured by the active students in the program.

There is only one question. Answering it will take about 2 minutes.

Your cooperation will be very much appreciated!

Dr. Stefanie von Felten, Dr. Petra Lindemann-Matthies & Prof. Bernhard Schmid

Future development of the Graduate Program Ecology

1. Which three courses from the list below are your favourite ones and should be offered by the Graduate Program Ecology in the future? Please choose exactly THREE courses!

(The list contains courses either suggested by students and faculty before or during our survey, where you were asked to add more courses.)

- More advanced stats courses (e.g., Imer)
- Databases (e.g., Endnote, Web of Science, others)
- Rearing animals in the lab
- Biodiversity experiments (theoretical background)
- Visualisation of scientific results (slides, posters)
- Lab techniques
- Writing a successful postdoc proposal
- Analysis of acoustic data
- Data visualization (Graphics)
- Conference organisation (like former Umweltforschungstag)
- Environmental education/psychology/ethics
- Ecological modelling course
- Food web analysis
- Software skills for putting together a PhD
- Animal identification course (Insects, Invertebrates)
- Plant identification course
- Ecological theory (adapted to PhD level)
- Successful job application methods (outside academia)
- Didactic
- Climate Change
- Energy Efficiency

New courses for the Graduate Program Ecology

- Sustainability (e.g., GRI Environmental Management System, ISO 14001)
- Introduction to Genstat
- Learning how to use field equipment
- Photography
- Special seminar for PhD students
- Plant-animal interactions
- Spatial statistics
- Environmental Protection
- GIS course with focus on ecological application

New courses for the Graduate Program Ecology - Part 2

Welcome!

Dear participant of the Graduate Program Ecology

This is the second and last follow-up of our survey to evaluate the Graduate Program Ecology. We now evaluated the 11 most chosen new course topics for the program. As a last step, we would like you to rank these 11 topics according to your interest.

There is only one question. Answering it will take about 2 minutes.

Your cooperation will be very much appreciated!

Dr. Stefanie von Felten, Dr. Petra Lindemann-Matthies & Prof. Bernhard Schmid

Future development of the Graduate Program Ecology

1. How would you rank the 11 course topics in the list below according to your interest in taking such a course?

(The list contains the 11 course topics chosen most frequently, i.e. ≥ 4 times, when active students in the program were asked to choose their three most favourite ones out of 30 suggestions. The order of topics is randomized.)

	1 most interested	2	3	4	5	6	7	8	9	10	11 least interested
Ecological modelling course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More advanced stats courses (e.g., lmer)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ecological theory (adapted to PhD level)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visualisation of scientific results (slides, posters)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing a successful postdoc proposal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Software skills for putting together a PhD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental education/psychology/ethics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plant-animal interactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GIS course with focus on ecological application	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spatial statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Successful job application methods (outside academia)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Evaluation Graduate Program Ecology - January 2009 - Former

Welcome!

Dear former participant of the Graduate Program Ecology

Ten years of experience provides us with a good opportunity to evaluate the Graduate Program Ecology and your satisfaction with the program. We are therefore very interested in your feedback, ideas, and answers to our questions.

Answering the questionnaire will take about 10 minutes.

Your cooperation will be very much appreciated!

Dr. Stefanie von Felten, Dr. Petra Lindemann-Matthies & Prof. Bernhard Schmid

A. What do you remember about the Graduate Program Ecology?

1. Did you participate in the Graduate Program Ecology as a

PhD student

Postdoc

Other (please specify)

2. Which courses do remember spontaneously from the Graduate Program Ecology?

3. Which courses from the Graduate Program Ecology proved most useful for you? If possible, specify whether the course was useful during your PhD or later in your professional life.

4. Was there any course that was not included in the graduate program (at that time) that would have been very valuable for your professional life today?

B. Publication output from your PhD

5. How many peer-reviewed papers from your PhD were published?

	0	1	2	3	>3
As first author before your defense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As co-author before your defense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As first author after your defense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As co-author after your defense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C. Information on former participants in the Graduate Program Ecology

Of course, all information will be treated confidentially.

6. What was your research field during your PhD?

- Anthropology
- Behavioural Ecology
- Botany
- Ecology
- Environmental perception/education
- Geography
- Zoology

Other (please specify)

7. At which Institute(s) did you work for your PhD? (Multiple answers are possible)

- Agroscope Reckenholz
- Institute of Environmental Sciences (UZH)
- Institute of Integrative Biology (ETHZ)
- Institute of Terrestrial Ecology (ETHZ)
- Institute of Terrestrial Ecosystems (ETHZ)
- Institute of Zoology (UZH)
- Swiss Federal Institute for Forest, Snow and Landscape Research WSL
- Swiss Ornithological Institute Sempach
- Zoological Museum (UZH)

Other (please specify)

8. When did you finish your PhD (the year of your defense)?

9. How long did you take to complete your PhD (years and months until the time of your defence)?

10. Did you work as a postdoc after your PhD? (only yes answers please)

For how many years?

Are you still working in Academia?

Is your current position permanent or temporary?

11. What is your current occupation? Please describe your job and where you are employed.

12. Are you

- Female
- Male

13. Do you have children?

How many? No children 1 2 >2

14. Do you/did you participate in any mentoring program(s)?

- No
- Yes

If yes, in which program?

Qualitative Interview with a participant of the Graduate Program Ecology

- 1) What do you like about the Graduate Programme in Ecology?
 - a. General strengths of the program?
 - b. Personal highlights?
- 2) What do you dislike?
 - a. General weaknesses, things that most urgently need improvement?
 - b. Personal low points or disappointments?
- 3) Which courses were most useful for you to accomplish your PhD-thesis and should be kept in any case?

4) What courses would you organise, given that we have now additional money for teaching and can afford to organise additional/special courses?

5) How do you manage with the structure of the program (with its four modules)?

a. Do you find it difficult to meet the condition of 3 CP in each module (e.g., enough courses offered)?

b. Was the scheduling of courses a problem (block courses vs weekly courses)

c. Do you understand what the four modules stand for?

6) Anything else you would like to say?

Date: -----

Person interviewed: ----- Interviewer: -----

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Graduate programmes are important instruments in academic education. The Graduate Program Ecology was started in 1999 as a pioneer programme at the Institute of Environmental Sciences at the University of Zurich. The programme aims to foster both the research skills of PhD students in the interdisciplinary field of ecology, and general skills highly requested by the academic and non-academic job market.

Since 2005, the Graduate Program Ecology is part of the Life Science Zurich Graduate School (LSZGS) which was founded as a common platform for the recruitment and education of PhD students at the University and ETH Zurich.

Almost ten years of experience and the new environment of the LSZGS provided good reasons for an evaluation, in order to further develop the programme.



**INSTITUTE OF
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