THE UNIVERSITY OF BRITISH COLUMBIA
Curriculum Vitae for Faculty Members

Date: August 21, 2001 **Initials**:

1. SURNAME: Doebeli **FIRST NAME**: Michael
MIDDLE NAME(S): Walter

2. DEPARTMENT/SCHOOL: Zoology (50%) and Mathematics (50%)

3. FACULTY: Science

4. PRESENT RANK: Assistant Professor **SINCE**: January 1, 1999

5. POST-SECONDARY EDUCATION

University or Institution	Degree	Subject Area	Dates
University of Basel, Switzerland (Prof. H. Kraft, advisor)	M.Sc.	Mathematics	1981-1986
University of Basel, Switzerland (Prof. H. Kraft, advisor)	Ph.D.	Mathematics	1986-1992

Special Professional Qualifications

Habilitation in Zoology, University of Basel, Switzerland, October 1997

6. **EMPLOYMENT RECORD**

(a) Prior to coming to UBC

University, Company or Organization	Rank or Title	Dates
University of Basel (Prof. S.C. Stearns, head of group)	Postdoctoral Fellow	1992-1994
University of Basel	Assistant Professor	1994-1999

(b) At UBC

Rank or Title	Dates
Assistant Professor	1999-present

(c) Date of granting of tenure at U.B.C.:

n.a.

7. LEAVES OF ABSENCE

University, Company or Organization At which Leave was taken	Type of Leave	Dates
UBC	**Official starting date at UBC was 1.1.99, but I kept my job at Basel until 30.6.99**	**1.1.99-30.6.99**

8. TEACHING

(a) Areas of special interest and accomplishments

Mathematically Biology is a thriving field, and I am delighted to be able communicate the basics of this field as well as more advanced topics to a growing number of interested students. Basic training for Mathematical Biology includes Calculus as well as introductory courses into ecological and evolutionary modeling. Advanced training consists of more technical courses in mathematical biology (complex dynamical systems, game theory, and theoretical ecology and population genetics). Advanced training also includes the supervision of honors undergraduate students, Masters students, and Ph.D. students. The main teaching philosophy I try to employ is 'learning by doing'. Thus homework problems, labs, student presentations and discussions receive special attention. In addition, I try to interact with the students as much as possible. In general, learning is most effective when the students have a personal interest of some sort in the subject, and I strive to elicit such interests. Clarity of presentation and personal engagement are essential for successful teaching. I have received encouraging feedback from students at UBC, and my teaching evaluations have been good (average of **4.07 for Calculus**, with an 3.87 average for the other instructors who taught different sections of the same courses; **4.67 for Biology 301**). Masters and Ph.D. students of mine were involved in 10 of the publication listed in this cv (s. below).

(b) Courses Taught at the University of Basel

At the University of Basel I taught introductory courses in ecology and evolution for 6 years, and I taught an advanced course on complex dynamics in ecological and evolutionary systems. I supervised one Ph.D. student and several Masters students.

I taught the following courses at Basel. The number of times and years in which I taught these courses are indicated in the table.

(1) Introduction to Ecology, Evolution, and Behavior. This was an introductory course describing the fundamentals of evolutionary ecology. The total number of students in this course was ca. 60-70, divided into three or four groups, and each group had one instructor. Classes were held in the form of discussion groups, which are held 5 hours per week, with brief introductory lectures by the instructors on the topic of the classes. In addition, there were overview lectures given by the instructors. This is a very effective form of teaching that is only possible with small groups of students. I taught this course for 6 consecutive years, 2 semesters a year, for a total of 12 semesters.

(2) Complex Dynamics in Ecology and Evolution. This was an advanced course that I developed myself (without a textbook). The course introduced basic properties of dynamical systems in discrete and continuous time dynamical systems arising in ecological and evolutionary modeling. Topics such as chaos and dynamics of spatially structured populations were extensively discussed. This was a one-semester (12 weeks) course consisting of 3 hours of lectures per week and one hour for problem solving. I taught this course twice.

(3) Seminar in Population Biology. This was a ‘theoretical field course’, held as a one-week seminar held in a remote town in the Swiss mountains with the participation of international faculty. Each year, there are about 40 international students, whose task it was to write a grant proposal on a subject of their choice. The faculty members gave talks on various topics and assisted the students in all stages of writing the proposals. I participated once as a regular faculty member, and I organized the whole course once.

(4) The Zoology Institute of the University of Basel holds a 2-week field course every year. On two occasions (Poland; Corsica, France) I was one of the instructors, which meant assisting the students in planning small projects and in doing statistical analyses.

Session	Class Size	Hours Taught		
		Lectures	Tutorials	Labs
(1) Two terms in each of 93/94, 94/95, 95/96, 96/97, 97/98, 98/99 (total of 12 semesters)	15-20	1 per week (total: 180)	4 per week (total: 720)	
(2) summer term in 95 and 97 (total of 2 semesters)	20	3 per week (total: 108)		1 per week (total: 36)
(3) Seminar in population biology, summer term 95 and 97				1 week
(4) Field course, summer term 93 and 95				2 weeks

(c) Courses Taught at UBC

Session	Course Number	Scheduled Hours	Class Size	Hours Taught			
				Lectures	Tutorials	Labs	Other
Winter term 99	Zool 502 (1)	4/wk	17		3/wk		Seminar 1/wk
Winter term 99	Math 102 (2)	4/wk	82	3/wk	1/wk	1/wk	
Spring term 00	Zool 502 (1)	4/wk	16		3/wk		Seminar 1/wk

Spring term 00	Math 103 (2)	5/wk	90	3/wk	1/wk	1/wk	
Spring Term 01	Math 103 (2)	5/wk	87	3/wk	1/wk	1/wk	
Spring term 01	Biol 301 (3)	4/wk	25	3/wk		1/wk	
Fall Term 02	Math 361 (4)	3/wk	Ca. 35				

(1) Advanced Ecology (Zool 502) is an advanced ecology and evolution seminar course that is typically taken by all new graduate students in Zoology. The course consists of lectures given by members of the department and of student talks given on topics corresponding to the lectures. In addition, students are required to attend the Ecology and Evolution Seminar series, and the talks from this series are discussed in class. In my first year at UBC I was co-organizer of this course in Term I, and sole organizer in Term 2. Being the organizer meant giving a number of lectures, organizing the series of external speakers, leading the discussions, and giving feedback to the students about their talks.

(2) Calculus for Life Sciences (Math 102/103). This is a new Calculus course that has recently been developed by members of the Department of Mathematics at UBC. The technology for this course was developed before my arrival at UBC; I have been a member of the team that taught this course in the past years. There are two main new aspects of this course. First, the course is based on Internet technology. The course notes are on-line on the web, as are many in-class demonstrations of the basic concepts and ideas underlying calculus. Animated graphics greatly help to clarify these basic concepts and have received good reviews from the students (which is a surprise, given the topic of the course). Second, students get hands-on practice in specially designed computer labs, which also have made many friends among the students (as well as a few stern opponents). In addition, I have always given an extra tutorial hour for solving homework problems in this course. This course represents a great improvement over more traditional ways of teaching calculus to life science students, whose interest in the topic is generally low. The course is evolving over the years as new homework problems and new computer labs are developed that involve applied problems from the Life Sciences.

(3) Introduction to Mathematical Biology for Biology Students (Biol 301). This is a course that introduces students to basic models in ecology and evolution in both discrete and continuous time. The course also provides an introduction into the basics of dynamical systems theory, such as stability analysis, period-doubling, and chaos. Unlike in Calculus there is no established syllabus for this course, and instructors develop their own version of the course, depending, in part, on their interests. I developed my own syllabus for this course, including

lecture notes, homework problems, and computer labs. In addition, students were required to do a small independent research project.

(4) In the summer of 2000 I wrote a successful proposal for two new undergraduate courses in Mathematical Biology (Math 361 and Math 462). I am teaching Math 361 for the first time in the fall of 2001. This course is an introduction into Mathematical Biology for Math undergraduates, giving an overview of basic modeling approaches in a broad range of areas such as ecology, genetics, epidemiology, and neurology. When the course was first listed there were doubts whether we could get enough students (15 students are required for an undergraduate course in Mathematics), but by the start of the term ca. 40 students had registered, which shows that the course seems to fill a gap. Math 462, which will not be taught this year due to a lack of instructors, is a projects course that would build on Math 361 by having students do a number of in-depth projects on different topics touched on in Math 361.

(c) ***Graduate Students Supervised:*** **9 total**

Student Name	**Program Type**	**Year**		**Principal Supervisor**	**Co-Supervisor(s)**
		Start	**Finish**		
Albert Blarer	M.Sc. at University of Basel	1994	1995	Michael Doebeli	Steve Stearns
Albert Blarer	Ph.D. at University of Basel	1995	1999	Michael Doebeli	
Kurt Brauchli	M.Sc. at University of Basel	1997	1999	Michael Doebeli	
Benjamin Szylagi	M.Sc. at University of Basel	1997	1998	Michael Doebeli	
Martin Ackermann	M.Sc. at University of Basel	1996	1998	Steve Stearns	Michael Doebeli
Daniel Bloch	M.Sc. at the University of Basel	1999	2001	Michael Doebeli	Andreas Erhardt

Rahel Luethy	M.Sc. at the University of Basel	1999	2001	Michael Doebeli	
Gerda Saxer	Ph.D. at UBC	1999	ongoing	Michael Doebeli	
Sandi Merchant	M. Sc. at UBC	2001		Michael Doebeli	

Graduate student committees (9 total):

Student Name	**Program Type**	**Year**		**Principal Supervisor**	**Co-Supervisor(s)**
		Start	**Finish**		
Gerda Saxer	Ph.D. (Zoology)	1999		Michael Doebeli	
Cort Griswold	Ph.D. (Zoology)	1999		Michael Whitlock	
Tim Duty	Ph.D. (Physics)	1993	2000	Birger Bergerson	
Grant Poje	M.Sc. (Zoology)	1998	2000	Rosie Redfield	
Art Poon	M.Sc. (Zoology)	1998	2000	Sally Otto	
Alex Grant	Ph.D. (Zoology)	1998		Sally Otto	
Allan Costello	Ph.D. (Zoology)	2000		Eric Taylor	
Ally Dilara	Ph.D. (Forestry)	2000		Kermit Ritland	
Sandi Merchant	M.Sc. (Mathematics)	2001		Michael Doebeli	
Margarita Ifti	Ph.D. (Physics)	2000		Birger Bergerson	

(d) Continuing Education Activities

Directed studies:

1999/2000: Brian Cheng (Zoology), Shawn Taylor (Agriculture), Bill Robichaud (Zoology)
2000/2001: Todd Klaiman (Zoology), Leonardo Frid (Zoology)

(e) Visiting Lecturer (indicate university/organization and dates)

n.a.

(f) Other

n.a.

Postdoctoral Fellows (2 total):

1998-2001: Dr. T. Killingback: critical dynamics in spatially structured populations and the evolution of cooperation through variable investment. Dr. Killingback was paid by a grant I was awarded by the Swiss National Science Foundation. He is now an Assistant Professor at the ETH Zuerich.

2002-2004: Dr. C. Hauert: Game theory and cooperation (funded by the a grant to Dr. Hauert from the Swiss National Science Foundation).

9. SCHOLARLY AND PROFESSIONAL ACTIVITIES

(a) Areas of special interest and accomplishments

My general area of research is theoretical ecology and evolution, in which I have been doing independent research since 1993. Currently, I am most active in three broad areas.

1. Integration of ecological and population genetic modeling approaches: **adaptive dynamics of speciation**

Ecological models traditionally assume that interacting populations are phenotypically uniform. Using a number of different models, I am investigating how results and predictions from ecological models change when this assumption is dropped, that is, when phenotypic and genetic variation is included in ecological models. For example, I have shown that quantitative genetic variation in a character that determines ecological interactions can have profound

effects on the dynamics of simple ecological models, and I have argued that, at least for the class of models studied, the dynamics of polymorphic populations generally tends to be simpler than the dynamics of corresponding monomorphic populations (e.g. refs. 11,19). This work combining ecological and genetic considerations in a single approach has culminated in the development of new models for sympatric speciation, that is, for the formation of two descendent species out of a single ancestral species in the absence of geographical isolation. These models were developed together with Ulf Dieckmann from the International Institute for Applied Systems Analysis in Vienna. Our recent publication in Nature (ref. 35) has attracted a lot of attention (80 citations in two years), including a News and Views in *Nature*. We are now extending this work to spatially structured populations (see point 2 below).

In a more general vein, Dieckmann and I are in the process of writing the first full-length textbook on adaptive dynamics, a new evolutionary methodology whose development was initiated by Hans Metz at Leiden University roughly a decade ago. Our book, entitled Coevolutionary Dynamics, will be published in the prestigious Population Biology Monograph Series by Princeton University Press. I have been pleased with the progress of the book, with 8 of 16 chapters now existing in draft version. (Five of these drafts are for my own chapters.) This book is my most major research contribution for 2001 and will hopefully generate substantial interest in the evolution community.

A promising challenge for the future is to test theories about speciation in experimental model systems of microorganisms, i.e. using experimental evolution. To achieve such an integration of mathematical modeling and experimental investigation is one of my goals for the future. I have developed a collaboration with Dr. M. Travisano at the University of Houston, who is an expert on experimental evolution. At present, my graduate student Gerda Saxer is in Houston setting up experimental systems for studying evolutionary diversification, i.e. speciation, in bacteria.

Key publications: 11, 13, 19, 30, 35, 39

2. Ecology and evolution of spatially structured populations.

My second general area of research concerns the effects of another form of variability on ecological and evolutionary processes, namely the effects of spatial structure and heterogeneity (e.g. refs. 5, 17, 21, 22, 25, 27, 28). Even though this is currently a very active area of research, many open questions remain. For example, most of the metapopulation models that address the question of how spatial structure affects the complexity of ecological dynamics only deal with short range dispersal between nearest neighbor populations, and it is not clear how the results generalize to the often more realistic assumption of mid- to long-range dispersal. Also, many metapopulation models are for single species, and a lot of work remains to be done concerning the extension to community models comprising the interactions of several species in a spatially heterogeneous environment. Given that dispersal between local populations influences the dynamics of a metapopulation, it is also important to have some general ideas about how dispersal rates evolve. This leads to an interesting interaction between ecology and evolution: ecological dynamics determine which dispersal rates are evolutionarily advantageous, and the dispersal rates in turn influence the ecological dynamics. Our results on the evolution of

dispersal rates (see refs. 22, 24, 32) show that very interesting phenomena occur such as evolutionary branching, i.e. the split of a phenotypically uniform population into two coexisting lines, each with a different dispersal rate. Such branching is again closely related to sympatric speciation. Another rather poorly understood problem in metapopulation ecology is that of spatial pattern formation and how such patterns translate into observed diversity in local abundances of a species. To investigate this we have developed new models for spatially structured populations in which the spatial coupling is not only due to dispersal, but also to non-local ecological interactions such as competition. These models exhibit entirely different dynamics than models in which populations are only coupled by dispersal (see ref. 50).

Key publications: 5, 17, 22, 28, 50

3. Evolution of cooperation

Spatial structure can also have a strong effect on evolutionary outcomes, as we have shown (collaboration with my postdoc Dr. T. Killingback) by considering spatially extended evolutionary games (see refs. 17, 25, 28, 37, 34) In particular, we have shown in refs. 28 and 37 that spatial structure greatly facilitates the evolution and maintenance of cooperation, which is the third area where I am currently very active. Based on the standard Prisoner's Dilemma, in which players have to adopt one of two possible strategies, Defect or Cooperate, and in which Defect is always the evolutionarily stable strategy, we have developed new, simple, but much more realistic models for the evolution of cooperation by introducing the notion of investment, which is a cooperative act whose degree of cooperation can vary continuously, so that the extreme forms of investment, i.e. everything or nothing, correspond to the two strategies in the standard Prisoner's Dilemma. Introducing continuously varying degrees of cooperation leads to a simple generalization of the Prisoner's Dilemma that turns out to be very helpful for understanding the evolutionary dynamics of cooperative behavior, which is an area that still attracts much attention (e.g. ref. 36, published in Nature). Most importantly, we have shown, using spatial evolutionary game theory, that spatial structure greatly facilitates the gradual evolution of cooperation from a state in which there is no cooperation (all investments are close to 0) to a state in which all individuals show substantial degrees of cooperation. A number of different authors have taken up the idea of continuous investments in recent publications. It seems possible to test our models with empirical research. There are two lines along which this can be done. The first is again using experimental evolution in microorganisms. The second is using the Internet by setting up a game for human players to test whether investments evolve to positive values in spatially structured populations, but not in populations in which interactions are random. This will be one of the main projects for a new postdoc who is starting in my group in spring 2002 (Dr. C. Hauert, University of Vienna).

Key publications: 23, 28, 36, 37

In sum, my main contributions are in combining ecological and genetic modeling, leading to a theory of sympatric speciation, in the theory of the dynamics of spatially structured populations,

and in the theory of the evolution of cooperation. There are two main challenges for my future work. The first is to extend and weave together the various theoretical threads. In each of the areas mentioned above, many important questions remain unanswered. The second challenge is to bridge the – still rather wide - gap between theoreticians and empiricists in evolutionary ecology by using experiments to test the theoretical results. My theoretical work lies at the interface of different disciplines: dynamical systems theory, game theory, ecology, evolution, genetics, and behavior. Therefore, my work is interdisciplinary, and I have many contacts with both mathematicians and biologists. It is my aim to reinforce these bridges.

(b) Research or equivalent grants (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))

Granting Agency	**Subject**	**COMP**	**$ Per Year**	**Years**	**Principal Investigator**	**Co-Investigator(s)**
SNF (Swiss National Science Foundation)	Nonlinear Dynamics in Ecology and Evolution	C	$50,000	1995-1998	Michael Doebeli	
SNF	Dynamics of spatially structured populations (seminar)	C	$6,000	1998	Michael Doebeli	Yoh Iwasa
SNF	Dynamics of spatially structured communities	C	$50,000	1998-2001	Michael Doebeli	
SNF	Sexual reproduction and evolutionary game theory	C	$48,000	1999-2002	Michael Doebeli	
ESF (European Science Foundation)	Non-equilibrium Adaptive Dynamics	C	$6,000	1999	Michael Doebeli	Ulf Dieckmann, Hans Metz
Roche Research Foundation (Switzerland)	Experimental evolution of speciation in Yeast	C	$25,000	1999	Michael Doebeli	

UBC	Start-Up		$75,000	1999	Michael Doebeli	
NSERC		C	$37,000	1999-2003	Michael Doebeli	

(c) Research or equivalent contracts (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC).

n.a.

(d) Invited Presentations

Over the past years I have been invited to speak at various universities, including:

1993: University of Paris IV
University of Paris-Sud
1994: Oxford University
University of Warwick
1995: University of Lausanne
1996: University of Utrecht
University of Leiden
University of Turku
1997: University of Zurich
University of Helsinki
1998: Humboldt University, Berlin
1999: Western Washington University
2000: University of Toronto
2001: University of Tsukuba, Japan

(e) Other Presentations

n.a.

(f) Other

1994: 7th Annual Complex Systems Summer School of the Santa Fe Institute, Santa Fe, New Mexico, USA.

1996: Visiting Scientist at the University of Utrecht with Prof. G. De Jong (July-October)

(g) Conference Participation (Organizer, Keynote Speaker, etc.)

1994: Invited speaker at the Jacques Monod Conference on Biodiversity in Aussois, France

1995: Organizer of a symposium on 'Complex Dynamics and Evolution' at the 5th International Congress of the European Society for Evolutionary Biology in Edinburgh, U. K.

1996: Invited speaker at a workshop on "Adaptive Dynamics" in Matrahaza, Hungary

Invited speaker at a workshop on "Genetics and Ecology" in Frankfurt, Germany

1998: Organizer of a 4-day workshop on lattice models (co-organizer: Prof. Yoh Iwasa, Kyushu University, Japan)

Invited speaker at a workshop on the evolution of dispersal, Tvarminne, Finland

1999: Invited speaker in the Vice President Symposium of the annual meeting of American Society for Naturalist, Madison, WI

Co-organizer of a symposium on 'Interactions between ecology and evolution: non-equilibrium processes and adaptive dynamics' at the 7th International Congress of the European Society for Evolutionary Biology in Barcelona, Spain.

Co-organizer of a 3-day symposium on 'Adaptive speciation' at the International Institute of Applied Systems Analysis IIASA, Laxenburg, Austria

Speaker at the Annual Meeting of the European Society for Mathematical and Theoretical Biology

Invited Speaker at PIMS workshop on Mathematical Ecology

2000: Invited Sessional Speaker at the Annual Meeting of the Canadian Mathematical Society, Hamilton, ON

2001: Speaker at the Annual Meeting of the Society for Mathematical Biology, USA (Hilo, HI)

Invited Plenary Speaker at the Annual meeting of the Society for Population Ecology in Japan

10. SERVICE TO THE UNIVERSITY

(a) Memberships on committees, including offices held and dates

Committee for reviewing the hiring plan of the Department of Zoology, UBC

Hiring committee 2000/2001 (Mathematics Department; only one committee per year for all hirings)

Search Committee for Ecology position (2001, Zoology Department)

Renovations committee (2001, Mathematics Department)

Merit Review Committee (2001, Zoology Department)

(b) Other service, including dates

Imagine UBC mentor (2000)

11. SERVICE TO THE COMMUNITY

(a) Memberships on scholarly societies, including offices held and dates

Member of:

European Society for Evolutionary Biology
Society for the Study of Evolution
European Society for Mathematical and Theoretical Biology
Canadian Mathematical Society
Center for Biodiversity (UBC)
Institute for Applied Mathematics (UBC)

(b) Memberships on other societies, including offices held and dates

n.a.

(c) Memberships on scholarly committees, including offices held and dates

n.a.

(d) Memberships on other committees, including offices held and dates

n.a.

(e) Editorships (list journal and dates)

1996 - 2001: Associate Editor of the Journal of Evolutionary Biology, the leading journal on Evolution in Europe.

(f) Reviewer (journal, agency, etc. including dates)

I review ca. 25-30 papers a year for various leading international journals, including

Nature
Science
Evolution
American Naturalist
Ecology
Ecology Letters
Animal Ecology
Journal of Evolutionary Biology
Proceedings of the Royal Society London B
Theoretical Population Biology
Journal of Theoretical Biology
Journal of Mathematical Biology
Bulletin of Mathematical Biology
Journal of Ecology
Mathematical Biosciences
Ecological Modeling
Selection

I also review several grant applications per year for various agencies, including

NERC (U.K.)
SNF (Switzerland)
NSERC (Canada)

(g) External examiner (indicate universities and dates)

University of Helsinki (Ph.D. thesis of Mikko Heino, 1998)

(h) Consultant (indicate organization and dates)

n.a.

(i) Other service to the community

n.a.

12. AWARDS AND DISTINCTIONS

(a) Awards for Teaching (indicate name of award, awarding organizations, date)

n.a.

(b) Awards for Scholarship (indicate name of award, awarding organizations, date)

1987: Stipend from the Batschelet Foundation, Basel, for a one-year exchange visit at Brandeis University, Boston, USA.

1992: Stipend from the Janggen-Pöhn Foundation, St. Gallen, Switzerland, for a 2-year postdoc at the Zoology Institute, University of Basel.

2000: Early Career Scholarship, Peter Wall Institute of Advanced Studies, UBC

(c) Awards for Service (indicate name of award, awarding organizations, date)

n.a.

(d) Other Awards

n.a.

13. OTHER RELEVANT INFORMATION (Maximum 0ne Page)

The following notes are intended to help appreciate the difference between the Middle European and the Canadian system, and to help putting my academic position into perspective.

The Swiss academic system is organized differently from the North American tenure-track system in that junior faculty members are usually administratively attached to a large research division headed by a senior faculty member. The tenure-track system does not yet exist in Switzerland. Junior faculty members have non-tenured appointments for a fixed term, and tenure is only obtained at the rank of full professor, which are almost never in-house appointments.

At the University of Basel I had, from 1994-1999, the position of “Assistant”, which is academically equivalent to the Canadian Assistant Professor position. During this time I developed and supervised my own group of researchers working in theoretical biology including M.Sc. and Ph.D. students and a Postdoc.

I received the ‘Habilitation’ in Zoology from the University of Basel in 1997. This is a traditional degree that qualifies faculty members as official ‘University teachers’ (the title goes back to the times when faculty got their pay directly from the students; the degree authorized faculty to teach at the university and thus earn money by teaching). Nowadays, it is a degree awarded for excellence in both academic and teaching performance. It is approximately equivalent to the transition between assistant and associate professor in the North American academic system, although it does not carry any weight for tenure, except for extramural applications. Academic excellence is evaluated through international peer review, much like in promotion and tenure granting procedures at Canadian Universities.

THE UNIVERSITY OF BRITISH COLUMBIA
Publications Record

SURNAME: Doebeli **FIRST NAME**: Michael
Initials:
MIDDLE NAME(S): Walter

Date: August 3, 2001

Summary

Category	1a	1b	1c	2a	2b	2c
Last 5 years	6	31	2	1	4	1
Total	6	41	2	1	4	1

1a: Publications in the 3 major international general science journals Nature, Science, and PNAS
1b: Total publications in major international journals
(for more information about the journals in which I published see notes following the list of publications)
1c: Book reviews

2a: Books edited
2b: Book chapters
2c: Conference Proceedings

1. REFEREED PUBLICATIONS IN INTERNATIONAL JOURNALS

In each of the publications listed below I have contributed substantially to the theoretical work and in most cases I have written the paper. In my field the order of authorship is typically based on the degree of contribution, with the first author having made the largest contribution. In the list below this is also true in most cases (an exception is entry 35, in which the order of authors is alphabetical in order to express equal contributions).

Note: In the following list, publications with numbers 35 and higher involve work (results, writing, or revisions) done since my initial appointment at UBC, January 1, 1999.

List of Publications:

1. Doebeli, M. 1993. The evolutionary advantage of controlled chaos. *Proceedings of the Royal Society London B* 254: 281-286.

2. Doebeli, M. 1994a. Intermittent chaos in population dynamics. *Journal of Theoretical Biology* 166:325-330.

3. Doebeli, M. 1994b. Linear models for reductive group actions on affine quadrics. *Bulletin de la Société Mathématique de France* 122: 505-531.

4. Doebeli, M. and Koella, J. C. 1994. Sex and population dynamics. *Proceedings of the Royal Society London B* 257: 17-23.

5. Doebeli, M. 1995a. Dispersal and dynamics. *Theoretical Population Biology* 47: 82-106.

6. Doebeli, M. 1995b. Phenotypic variability, sexual reproduction, and evolutionary population dynamics. *Journal of Evolutionary Biology* 8: 173-195.

7. Doebeli, M. 1995c. Evolutionary predictions from invariant physical measures of dynamic processes. *Journal of Theoretical Biology* 173: 377-387.

8. Doebeli, M. 1995d. Updating Gillespie with controlled chaos. *American Naturalist* 146: 479-487.

9. Doebeli, M. and Koella, J. C. 1995. Evolution of simple population dynamics. *Proceedings of the Royal Society London B* 260: 119-125.

10. Blarer, A., **Doebeli, M.** and Stearns, S. C. 1995. Diagnosing senescence: inferring evolutionary causes from phenotypic patterns can be misleading. *Proceedings of the Royal Society of London B* 262: 305-312.

11. Doebeli, M. 1996a. Quantitative genetics and population dynamics. *Evolution* 50: 532-546.

12. Doebeli, M. 1996b. An explicit genetic model for ecological character displacement. *Ecology* 77: 510-520.

13. Doebeli, M. 1996c. A quantitative genetic competition model for sympatric speciation. *Journal of Evolutionary Biology* 9: 893-909.

14. Doebeli, M. 1996d. Reductive group actions on affine quadrics with 1-dimensional quotient: linearization when a linear model exists. *Transformation Groups* 1: 187-214.

15. Blarer, A. and **Doebeli, M.** 1996a. Heuristic optimization of the general life history problem. A novel approach. *Evolutionary Ecology* 10: 81-96.

16. Blarer, A. and **Doebeli, M.** 1996b. In the red zone. *Nature* 380: 589-590.

17. Killingback, T. and **Doebeli, M.** 1996. Spatial evolutionary games: hawks and doves revisited. *Proceedings of the Royal Society London B* 263: 1135-1144.

18. Ruxton, G. D. and **Doebeli, M.** 1996. Spatial self-organisation and persistence of transients in a metapopulation model. *Proceedings of the Royal Society London B* 263: 1153-1158.

19. Doebeli, M. 1997. Genetic variation and the persistence of predator-prey interactions in the Nicholson-Bailey model. *Journal of Theoretical Biology* 188, 109-120.

20. Doebeli, M. and Blarer, A. 1997. A note on the timing of tradeoffs in discrete life history models. *Journal of Evolutionary Biology* 10: 107-120.

21. Doebeli, M. and Ruxton, G. D. 1997a. Controlling spatial chaos in metapopulations with long-range dispersal. *Bulletin of Mathematical Biology* 59, 497-515.

22. Doebeli, M. and Ruxton, G. D. 1997b. Evolution of dispersal rates in metapopulation models: branching and cyclic dynamics in phenotype space. *Evolution* 51, 1730-1741.

23. Doebeli, M., Blarer, A. and Ackermann, M. 1997. Population dynamics, demographic stochasticity, and the evolution of cooperation. *Proceedings of the National Academy of Sciences* 94: 5167-5171.

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33. Koella, J. C. and **Doebeli, M.** 1999. Population dynamics and the evolution of virulence in epidemiological models with discrete host generations. *Journal of Theoretical Biology* 198: 461-475.

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35. Dieckmann, U. and **Doebeli, M.** 1999. On the origin of species by sympatric speciation. *Nature* 400: 354-357.

36. Killingback, T. and **Doebeli, M.** 1999 'Raise the stakes' evolves into a defector. *Nature* 400: 518.

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38. Stearns, S. C., Ackermann, M., **Doebeli, M.** and Kaiser, M. 2000. Experimental evolution of aging, growth and reproduction in fruitflies. *Proceedings of the National Academy of Sciences USA* 97: 3309-3313.

39. Doebeli, M. and Dieckmann, U. 2000. Evolutionary branching and sympatric speciation caused by different types of ecological interactions. *American Naturalist* 156: S77-S101.

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41. Maire, N., Ackermann, M. and **Doebeli, M.** 2001. On the evolution of anisogamy through evolutionary branching (In press in *Selection*)

1c: Book reviews:

42. Doebeli, M. 1998. Basic theory- Plain and simple. A review of population 'Biology Concepts and Models' by Alan Hastings (Springer New York). Journal of Evolutionary Biology 11, 647-648

43. Doebeli, M. 1999. The marginal value of relations. A review of 'Foundations of social evolution' by Steven A. Frank (Princeton University Press, Princeton). Journal of Evolutionary Biology 12, 837-838.

2. BOOKS

(a) Edited

Adaptive speciation (Ed. U. Dieckmann, H. Metz, M. Doebeli, and D. Tautz), Cambridge University Press, to appear

Note: The intention of this book is for it to meet the standards of a textbook rather than a proceedings volume. Consequently, editing this book involves a lot more work than one would think (or than I would have thought). So far we have had four editorial meetings in Vienna (in addition to an initial workshop for the authors of the book), with additional substantial editorial work in between these meetings.

(b) Chapters

44. Mylius, S. D., **Doebeli, M.** and Diekmann, O. 2001. Can initial invasion dynamics correctly predict phenotypic substitutions? In press in *Advances in Adaptive Dynamics* (U. Dieckmann and J. A. J. Metz, eds.)

45. Doebeli, M. and Dieckmann, U. 2001. Genetics and evolutionary branching. In press in *Advances in Adaptive Dynamics* (U. Dieckmann and J. A. J. Metz, eds.)

46. Dieckmann, U. and **Doebeli, M.** 2002. Speciation through evolutionary branching. In press in *Adaptive Speciation* (U. Dieckmann, D. Tautz, J. A. J. Metz, and M. Doebeli, eds.)

47. Doebeli, M. and Dieckmann, U. 2002. Parapatric speciation along an environmental gradient. In press in *Adaptive Speciation* (U. Dieckmann, D. Tautz, J. A. J. Metz, and M. Doebeli, eds.)

(c) Conference Proceedings

48. Doebeli, M. 2000. Controlling Chaos in systems of coupled maps with long range interactions. Pp. 123-129 *in* Unifying Themes in Complex Systems: Proceedings of the First International Conference on Complex Systems (ed. Y. Bar-Yam), Perseus Books.

3. WORK SUBMITTED (including publisher and date of submission)

49. Killingback, T. and **Doebeli, M.** The Continuous Prisoner's Dilemma and the evolution of cooperation through reciprocal altruism with variable investment (American Naturalist, submitted July 2000)

50. Doebeli, M. and Killingback, T. A new model for spatially structured populations (Theoretical Population Biology, submitted July 2001)

4. WORK IN PROGRESS (including degree of completion)

Doebeli, M. and Dieckmann, U. Spatial gradients and speciation (results almost completed; draft written)

Meszena, G., Dieckmann, U. and **Doebeli, M.** Evolutionary branching and the maintenance of genetic variation (half completed)

Luethy, R., Dieckmann, U. and **Doebeli, M.** On the evolutionary dynamics of mutualism (work completed, needs to be written up)

Doebeli, M. and Dieckmann, U. Taxon cycles through evolutionary branching with asymmetric competition. (30% completed)

Book project:

Dieckmann, U. and **Doebeli, M.** Coevolutionary Dynamics, Princeton University Press (Population Biology Monograph Series; ca. 300 printed pages; 8 of 16 chapters in draft version). See also information given in the section ‘Scholarly and Research Activities’ in this CV.

Appendix: Information on specialist journals in which I have published:

- *Proceedings of the Royal Society (London) B* publishes many important papers in population biology. Impact factor: 3.0
- *Evolution* is the premier journal for the study of Evolution in North America. Impact factor: 3.6
- *Journal of Evolutionary Biology* is the premier journal for the study of Evolution in Europe. Impact factor: 2.4
- *The American Naturalist* is one of the most respected journals in ecology and evolution. Impact factor: 3.9
- *Ecology* is the premier journal for the study of ecology. Impact factor: 3.7
- *Ecology Letters* is a new journal publishing important new findings in ecology. Impact factor: 1.9
- *Evolutionary Ecology* (now *Evolutionary Ecology Research*) is a respected specialist journal. Impact factor: 1.1
- *Theoretical Population Biology* is the most cited journal in Mathematical Biology. Impact factor: 1.8
- *Journal of Theoretical Biology* broadly covers theoretical developments in all areas of biology. Impact factor: 1.6
- *Bulletin of Mathematical Biology* and *Journal of Mathematical Biology* are both respected journals publishing typically more technical papers than *J. Theor. Biol.* or *Theor. Pop. Biol.* Impact factor: 1.1
- *Selection* is a new journal devoted to the study of evolution on all levels of organization (molecules, cells, organisms, populations). Impact factor: n.a.