

LETTER TO THE EDITORS:

**IN THE ACADEMIC JOB MARKET, WILL YOU BE COMPETITIVE?
A CASE STUDY IN ECOLOGY AND EVOLUTIONARY BIOLOGY**

JONATHON C. MARSHALL,^{a,*} PAUL BUTTARS,^a THOMAS CALLAHAN,^b JOHN J. DENNEHY,^c
D. JAMES HARRIS,^d BRYCE LUNT,^b MARKUS MIKA,^e AND ROBERT SHUPE^b

^a*Department of Zoology, Weber State University, Ogden, Utah 84408, USA*

^b*Department of Biology, Southern Utah University, Cedar City, Utah 84720, USA*

^c*Queens College and the Graduate Center of the City University of New York,
Flushing, New York 11367, USA*

^d*Centro de Investigação em Biodiversidade e Recursos Genéticos, 4485-661 Vairão,
Portugal*

^e*School of Life Sciences, University of Nevada Las Vegas, Las Vegas, Nevada 89154,
USA*

ABSTRACT

Over the last several decades, the percentage of permanent faculty positions at universities has declined significantly. Increasingly, courses are taught by adjunct instructors, graduate students, and postdoctoral fellows rather than by permanent faculty members. This creates intense competition for permanent positions. Data summarizing the general qualifications of newly hired first-time professors in permanent jobs are valuable for students contemplating graduate school and academic careers. These data should also help graduate students and postdoctoral fellows set goals that will enable them to be competitive for permanent academic jobs. Here we present data collected in a survey from 181 newly hired faculty members in the fields of ecology and evolutionary biology from around the world. We report the average number of publications, courses taught, years as postdoctoral fellows, and research grants received for successful job applicants. Our results indicate an extremely competitive environment for permanent academic jobs in the fields of ecology and evolutionary biology.

Key Words: job market, hiring trends, permanent academic positions

INTRODUCTION

Job prospects in higher education in the United States and worldwide face unprecedented uncertainty (Cohen, 2009). Nearly 70% of all state governments in the USA have announced significant budget cuts to public higher education for the 2008–2010 academic years (<http://www.case.org/Content/Miscellaneous/Display.cfm?contentItemID=8952>). Such cuts have resulted in hiring freezes, layoffs, and other personnel adjustments at

*Author to whom correspondence should be addressed. E-mail: jonmarshall@weber.edu

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all levels of higher education from community colleges to large flagship public universities (Horton, 2008; Lehman, 2008; Riley, 2008; Stellar, 2008). The global credit and economic crisis has also affected universities that depend heavily on endowment income such as Columbia, Duke, Harvard University, and the University of Virginia, as these schools have also announced hiring freezes and increased administrative scrutiny of faculty searches (Jan, 2008; Miller, 2008). Some schools are in such dire financial circumstances that they have begun to lay off both instructors (Ryman and Wright, 2008) and tenure-track faculty (Maffly, 2008).

These recent events are superimposed on an already rapidly changing academic landscape. Tenure-track jobs have decreased so much in the last couple of decades that now classes taught by tenured faculty are a distinct minority on our college campuses (Finder, 2007). Classes are increasingly being taught by part-time, adjunct faculty members, positions that generally receive lower wages and reduced benefits (Ma, 2003). The declining number of tenure-track jobs available is coupled to an increasing number of Ph.D.s being awarded every year. Between 1975 and 2000, the life sciences saw a steady increase in the number of Ph.D.s awarded each year, resulting in a 75% total increase during this 25-year span (Farrell, 2001). Since 2000, this trend has continued; for instance, in 2007 in the biological sciences, American universities awarded 7,173 Ph.D.s, an increase of 8.0% over 2006 (Lederman, 2008). Compare this to a mere 94 positions in biology advertised on the Chronicle of Higher Education website in December, 2008 (<http://chronicle.com/jobs/100/700/>), many of which were not even tenure-track appointments. Although this figure certainly doesn't represent all job opportunities, the outlook is at best highly competitive, at worst grim.

Given the diminishing prospects of securing a tenure-track or equivalent job, students who are contemplating graduate school, current graduate students, and postdoctoral fellow researchers in the life sciences in general, and specifically in ecology and evolutionary biology, would benefit from knowledge of the accomplishments and qualifications of people hired to tenure-track or equivalent jobs within the last several years. In this study, we surveyed tenure-track or equivalent permanent faculty members who have been hired within the last four years. In our survey, we gathered information on academic indicators such as number of publications, years spent as a postdoctoral fellow, number of grants received, and number of courses taught. We hope this information gives students benchmarks and guidelines as to the expectations and possible outcomes in pursuing an academic career. We also hope these data will help undergraduates contemplating graduate studies make a well-informed decision on their future careers paths and set adequate goals that will enable them to be competitive for tenure-track or equivalent jobs upon completion of their education.

DESIGN AND METHODS

A voluntary and anonymous online survey was created and posted at <http://FreeOnline-Surveys.com>, and recently hired faculty members were recruited to take the survey from several sources. Solicitations were sent to members of Evoldir and ECOLOG-L, two

popular email directories used by both evolutionary biologists and ecologists. Solicitations were also posted on the science blog <http://evolutionarybiologist.blogspot.com/>. Participants were encouraged to take the survey only if they had acquired their first tenure-track or equivalent permanent position within the four-year period 2004–2007. The questions included the participant's age at time of hire, gender, institutional status of place of hire (e.g., doctoral institution, masters institution, etc.), institution's geographic location, number of years spent as postdoctoral fellow, number of courses taught, number of publications as first author and as a co-author in journals divided into three impact factors categories, and number of grants divided into three different dollar (US) amount categories. Categories were compared for significant differences of mean values by performing two-sample, two tailed, *t*-tests with pair-wise Bonferonni corrections.

RESULTS

Results for all survey participants show extensive variation for the four main categories of age at time of hire, years as postdoctoral scholar, total number of publications, and total number of grants received (Fig. 1). Mean values for each category indicate a very competitive job market (age at hire = 33.54, years as postdoctoral scholar = 2.92, total publications = 11.75, total grants = 4.20). Table 1 gives survey results, where survey samples were adequate for a qualitative assessment, divided by institutional level, geography, and gender by geography. Although some general trends are noted, no categorical comparisons resulted in significant differences. Categorical results for number of courses taught and three different grant levels are also given in Table 1. Table 2 shows the results for the same categorical divisions in Table 1, for publications divided into groups based on first authorship, co-authorship, and impact level of journal. Again, some qualitative trends between institutional levels, geographical areas, and gender within geographical area are noted, but extensive variation within these groups did not result in significant differences.

DISCUSSION

Although significant variation exists in all categories and within all categorical groups, the qualitative message of this study is that prospective ecologists and evolutionary biologists are required to dedicate significant resources to publishing high quality papers, applying for grants, and teaching courses if they want a reasonable chance of eventually landing a permanent position at a college or university. This will not come as a surprise to most, but what is striking are the qualification of the average successful candidate regardless of level of institution, region of the world, or gender. The successful candidate will most likely be in their early 30s, will have spent several years as a postdoc, taught multiple courses, received several grants, and will have published more than ten articles, with the majority of these articles appearing in high impact journals (Table 1, Table 2). These statistics suggest that all students considering careers in ecology or evolutionary biology should expect a highly competitive market that most likely will require substantial time investment.

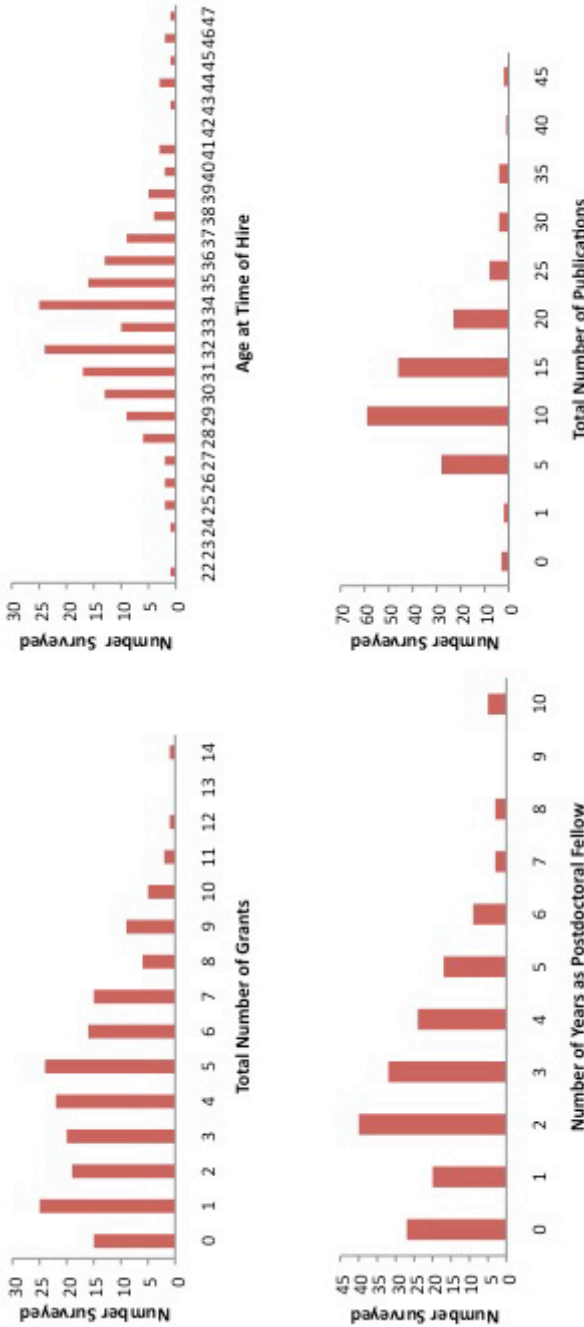


Fig. 1. Frequency counts for all individuals surveyed in this study. Four major categories given, years as postdoctoral fellow, age at hire for first tenure-track or equivalent position, total number of grants at time of hire, and total number of publications at time of hire. Sample size of respondents for grants, publications, and years as postdoc = 180. Sample size of respondents for age at first hire = 172.

Table 1
Age, years as postdoc, courses, and grants for tenure-track faculty hired within the last four years. Averages and standard deviations for each categorical group are given

Institution Group	Age	Postdoc	Courses	G > 100K	100K > G > 10K	G < 10K
Doctoral (N = 119)	33.1±4.1	3.08±2.15	1.50±2.23	0.89±1.29	1.24±1.20	2.04±2.11
Masters (N = 29)	33.9±3.9	2.65±2.36	2.83±2.95	0.55±0.90	1.24±1.37	3.32±2.32
Baccalaureate (N = 27)	34.0±3.9	2.52±2.13	2.29±2.43	0.29±0.54	0.81±0.87	2.55±2.10
USA (N = 128)	34.0±4.0	2.77±2.12	2.10±2.61	0.55±0.89	1.13±1.11	2.72±2.21
UK (N = 34)	32.5±4.1	3.53±2.09	0.88±1.06	1.0 ±1.47	1.34±1.57	1.62±2.12
Europe (N = 15)	32.4±5.7	2.86±3.31	2.20±3.30	1.6 ±1.68	1.53±1.36	0.77±0.83
USA DI Male (N = 43)	34.6±4.2	3.51±1.88	2.21±2.66	0.86±1.12	1.15±1.01	2.38±2.34
USA DI Female (N = 27)	32.7±2.2	2.25±1.89	0.85±1.37	0.37±0.63	0.66±1.12	2.66±2.05
UK Male (N = 25)	32.4±4.6	3.36±2.34	1.00±1.12	1.12±1.59	1.48±1.78	1.48±2.04
UK Female (N = 9)	32.8±2.6	4.00±1.12	0.56±0.88	0.67±1.12	1.00±0.87	2.00±2.40
All Surveyed (N=181)	33.5±4.2	2.92±2.24	1.87±2.48	0.75±1.16	1.20±1.22	2.35±2.19

Doctoral = institutions where Doctoral degree is highest degree granted; Masters = Masters degree is highest degree granted; Baccalaureate = Baccalaureate degree is highest degree granted; USA = United States of America and Puerto Rico; UK = United Kingdom, Canada, Australia, and New Zealand; Europe = Germany, France, Spain, Denmark, The Netherlands, Belgium, and Austria; DI = Doctoral institutions; N = number of individuals surveyed; Age = age when first hired; Postdoc = years spent as postdoctoral fellow; Courses = number of courses taught before hire; G = grants received before hire; K = value of grant in \$1,000 US.

Table 2
 Publication record for tenure-track faculty hired within the last four years. Averages and standard deviations for each categorical group are given

Institution Group	Total Publications	FA IF > 10	FA 2 < IF < 10	FA IF < 2	CA IF > 10	CA 2 < IF < 10	CA IF < 2
Doctoral (N = 119)	12.75± 7.63	0.90±1.51	4.89±2.85	2.07±2.51	0.90±1.48	2.91±2.74	1.40±2.23
Masters (N = 29)	10.24± 6.66	0.65±1.23	2.48±2.50	2.79±2.90	0.79±1.10	1.57±1.79	2.04±2.37
Baccalaureate (N = 27)	9.22± 5.73	0.56±1.15	2.67±2.54	2.63±2.86	0.52±0.80	2.00±2.63	1.08±1.38
USA (N = 128)	10.85± 6.66	0.76±1.43	3.73±2.84	2.05±2.39	0.75±1.05	2.38±2.29	1.44±2.09
UK (N = 34)	13.71± 8.18	0.97±1.76	5.17±3.08	2.71±3.06	1.29±2.47	2.75±2.83	0.93±1.09
Europe (N = 15)	15.27±12.87	0.92±1.82	4.53±2.59	3.46±3.85	0.73±1.27	3.13±3.60	3.26±3.75
USA DI Male (N = 43)	13.81± 7.21	1.09±1.87	5.26±2.97	2.23±2.38	0.88±1.13	2.86±2.61	1.63±2.54
USA DI Female (N = 27)	9.44± 4.15	0.62±1.01	3.63±1.90	0.96±0.98	0.74±1.13	2.74±1.30	0.88±1.40
UK Male (N = 25)	13.67± 7.94	1.08±1.91	5.32±3.20	2.20±2.24	1.40±2.66	2.96±2.72	0.92±1.15
UK Female (N = 9)	13.55± 9.31	0.67±1.32	4.78±2.86	4.45±4.60	1.00±1.94	2.22±3.19	1.00±0.93
All Surveyed (N = 181)	11.75± 7.76	0.83±1.52	4.08±2.95	2.30±2.67	0.85±1.45	2.53±2.58	1.48±2.19

Doctoral = institutions where Doctoral degree is highest degree granted; Masters = Masters degree is highest degree granted; Baccalaureate = Baccalaureate degree is highest degree granted; USA = United States of America and Puerto Rico; UK = United Kingdom, Canada, Australia, and New Zealand; Europe = Germany, France, Spain, Denmark, The Netherlands, Belgium, and Austria; DI = Doctoral institutions; N = number of individuals surveyed; FA = candidate was first author; CA = candidate was co-author; IF = ISI impact factor for journal.

We recognize several limitations of data gathered from online, anonymous, voluntary surveys. We were explicit in our instructions that participants only take the survey if they had been offered their first tenure-track job or equivalent position within the last four years and that they answer the questions as they applied at time of hire, but we are fully aware that confusion with regard to either of these instructions could inflate the numbers. Additionally, we cannot account for the bias of surveying principally from subscribers to *EvoDir* and *ECOLOG-L* email directories, as subscribers to these directories tend to be geared towards research rather than teaching issues. Persons employed at institutions requiring heavy teaching loads and lighter research requirements may have been less likely to participate. Therefore, the surveyed faculty may not represent a true cross section of successful first-time academics.

Our data show that permanent positions at all university levels require significant publication records, successful grant awards, and postdoctoral fellowships (Table 2). Regardless of degree levels offered by the newly employing institutions, first-time hires had, on average, two first-author publications in journals with impact factors between 2 and 10. This means students should strive to get multiple first authorship papers in journals like *Ecology*, *Evolution*, *American Naturalist*, *Molecular Ecology*, *Systematic Biology*, etc., and one first or co-authorship paper in a higher impact journal like *Science*, *Nature*, *PLoS Biology*, or *Trends in Ecology and Evolution*, if students want to be competitive for the limited number of jobs available. It appears more and more that newly awarded Ph.D.s need to use postdoctoral fellowships to attain the levels of merit described above. Interestingly, the number of postdocs in biology had increased from 25,000 in 1997 to 33,000 currently (Check, 2007).

On average, successful applicants from the UK and Europe were younger at age of hire, spent more time as postdocs, had more publications, and received more large grants than individuals from the US (Table 1, Table 2). This could possibly be accounted for in part by the fact that many European Ph.D.s take only 3 years to complete rather than the typical 4–6 years in the US. Female applicants from doctoral institutions in the US generally had lower averages than males in these same categories, but this pattern did not exist in comparisons between genders within the UK category. However, it should be strongly noted that these differences between genders for doctoral institutions in the US are qualitative and not statistically significant.

The implications of this study may be felt at all university levels and even beyond academia. The competition in the academic job market requires students to develop the skill set early to succeed in academia. Within a research lab and department, systematically involving students even at the undergraduate level, to participate in all aspects of research, from grant writing to final publication of the study, may become necessary. If academic departments' financial ability to offer expanding research opportunities for new faculty and potential students remains limited, then more rigorous enrollment criteria for graduate education should reduce the pressure on the job bottleneck. The field of ecology and evolution is uniquely linked to applied research, generally conducted by government agencies or Non-governmental Organizations (NGO). Academic institutions should take the opportunity to foster collaborations with those entities and prepar-

ing their student body for alternative careers in applied sciences. Ultimately, funding for scientific research, which is indirectly linked to political climate and public perception of science, is directly influencing job availability for positions in ecology and evolution (Nisbet, 2004; Shear, 2009). Efforts by academic institutions, in collaboration with government agencies, to educate the public on the value of scientific research could increase public funding for research institutions (House of Commons Science and Technology Committee. Funding of Science and Discovery Centres: Eleventh Report of Session 2006–07. 2007 Oct 22).

The results of this survey may be sobering to many graduate students and postdoctoral fellows, but it is our hope that this knowledge can serve as a motivational factor. It is also our hope that this information will be useful for career decisions and future planning for all involved in higher education, scientific research, and administration, especially in this time of economic hardship and budget uncertainty.

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REFERENCES

- Check, E. 2007. More biologists but tenure stays static. *Nature* 448: 848–849.
- Cohen, P. 2009. Doctoral candidates anticipate hard times. *The New York Times* Mar 06, 2009.
- Farrell, E.F. 2001. Number of Ph.D.'s awarded rebound after a 1-year dip. *The Chronicle of Higher Education* Nov 30, 2001.
- Finder, A. 2007. Decline of the tenure track raises concerns. *The New York Times* Nov 20, 2007.
- Horton, R.S. 2008. Pima Community College freezes hiring. *Tucson Citizen* Nov 25, 2008.
- Jan, T. 2008. Harvard freezing staff hiring, scrutinizes faculty searches. *The Boston Globe* Nov 25, 2008.
- Lederman, D. 2008. Doctorate production continues to grow. *Inside Higher Education* Nov 24, 2008.
- Lehman, M.B. 2008. Miami University to enact hiring freeze. *Dayton Business Journal* Oct 21, 2008.
- Nisbet, M.C. 2004. Public opinion about stem cell research and human cloning. *Public Opinion Quarterly* 68: 131–154.
- Ma, K. 2003. Adjunct faculty demonstrate at Palomar College. *The North County Times* Nov 11, 2003.
- Maffly, B. 2008. College faculty, staff can count on layoffs. *The Salt Lake Tribune* Dec 17, 2008.
- Miller, C.C. 2008. Beyond the ivied halls, endowments suffer. *The New York Times* Nov 25, 2008.

- Riley, H. 2008. Hiring freeze raises questions about success of students. *The Daily Lobo* Dec 15, 2008.
- Ryman, A., Wright, L. 2008. ASU plans to lay off faculty to save cash. *The Arizona Republic* Oct 28, 2008.
- Shear M.D. 2009. Obama proposes massive increase in science funding. *Washington Post* Apr 27, 2009.
- Steller, C. 2008. University of Minnesota imposes hiring freezes. *The Minnesota Independent* Nov 11, 2008.

RESPONSES

DARWIN WAS CORRECT – AND SO WERE MARSHALL ET AL. (2009)

Marshall et al. (2009) presented data collected from 181 newly hired faculty members in the fields of ecology and evolutionary biology from around the world. Along with many other metrics, they reported the number of publications by successful job applicants, which was 12.75 ± 7.63 for institutions that granted doctoral degrees; the number declines for institutions where Masters or Bachelors are the highest attainable degrees. On first reading these statistics were rather sobering, especially as I currently have students who wish to enter academia as research faculty.

Concurrent with reading an early version of the Marshall article I was on the search committee for two “tenure track positions in population, community, or ecosystem ecology” positions in the Zoology Department at the University of British Columbia, BC, Canada. So, to use my $N = 1$ in an effort to reject the Marshall et al. (2009) statistic, I opened the Excel spreadsheet on which we had various data related to the applicants. We had approximately 255 applications for the two positions, of which approximately 150 were not pursued because of very poor “fit” to the departmental needs. Ultimately, we made a short list of the top 52; the results were quite comparable to that reported by Marshall et al. (2009).

If we consider only those applicants who earned their Ph.D. since 2000 ($N = 46$), then the average number of peer-reviewed papers was 18.02, with an average of 9.7 as first author (Table 1). If we further reduce the pool and consider only the subset that earned their Ph.D. since 2006 ($N = 30$), then the average number of papers is 14.23, with 8.45 as first authors. Our top 15 candidates averaged 19.8, papers with 10.4 as first author. The respective numbers for the final six applicants that we interviewed are 17.2 and 10.7. Six applicants in our top 15 had at least one paper in *Science*, *Nature*, *PNAS*, or *Trends in Ecology and Evolution*.

I have not mined all of the data available from the 255 applicants, but in general, my $N = 1$ would concur with the rather chilling results reported by Marshall et al. (2009). Most of the really competitive applicants are in their early to mid-30s and all have post-doctoral experience. There is of course a trade-off: too much post-doctoral experience means you may be getting too old! One post-doc is essential, two is probably “safe”, but a third post-doc is likely a kiss of death.

Table 1

Average number (\pm SD) of peer-reviewed publications, and average number (\pm SD) of first-authored publications by various groups sampled from 251 applicants for two ecology positions in the Zoology Department at the University of British Columbia, BC, Canada

Group	Sample size	Average number of publications	Range	Average number as first author	Range
Ph.D. since 2000	46	18.02 \pm 7.44	6–42	9.7 \pm 4.77	3–27
Ph.D. since 2006	30	14.23 \pm 9.52	6–42	8.45 \pm 5.55	0–27
Top 15	10	19.8 \pm 13.1	9–46	10.4 \pm 5.4	4–26
Final 6 interviewed	6	17.2 \pm 10.8	9–38	10.67 \pm 7.9	4–26

In our particular search it should be noted (Table 1) that those few applicants with >40 papers in this past 5 or 6 years were not short-listed; some already held faculty positions elsewhere. This decision was not based on any metric of quality of the researchers, but in their lack of fit to the departmental needs. At the lower publication range, it is notable that a candidate with “only 9” papers was short-listed to the final 6. My own personal conclusion from this is that the #1 criterion for getting into a short-list is the degree of fit to departmental needs, followed by quality of publications. A high number of publications certainly catches a search committee’s eye, but that same eye rapidly scrutinizes where the papers are published. Again using the N=1 of our search, 9 papers in higher impact journals, and 30+ papers in a whole range of journals, both made it to the short-list.

The message to me is that students with a desire to pursue an academic research career need to begin early while they are senior undergraduates. Research faculty need to create opportunities for talented undergraduates to work in their labs or as field assistants, and if possible, to provide them the opportunity to do some independent research and lead them through the entire process from question development to a hands-on research experience, data analysis, writing and publishing. The vast majority of us in academic research careers in ecology and evolution appreciate that we have one of the best vocations in the world. It is, however, an increasingly competitive market and it is imperative that we impress upon undergraduates and early graduate students who wish to pursue such a career, that this is a competitive career path and they need to be certain that this is how they want to spend the rest of their lives. Darwin was correct after all; this is the survival of the fittest where fitness is a complex measure with many components, primary of which are the number and quality of peer-reviewed publications, and “fit” to the environment (department),

Roy Turkington

Dept. of Botany and Biodiversity Research Center
University of British Columbia
Vancouver, BC V6T 1Z4, Canada

LIFE HISTORY AND MULTI-LEVEL SELECTION IN ACADEME

The advice imbedded in the Marshall et al. (2009) case study assumes that the race for an academic position is among individuals who can improve their success by following the model of recently appointed faculty. The hiring rule appears to be “select the individual with the best cumulative record”. Selection, in this parable of Darwinian evolution, is intensely directional. But to paraphrase Wilson and Wilson (2008), we need to know whether this form of academic evolution is a contest amongst individuals or a “team sport”. In order to find the answer, it is instructive to explore, metaphorically, the rather peculiar life history of academe.

Euphemisms called “labs” coexist in structured universal aggregations where they compete with one another for scarce resources. Labs cooperate to produce copious numbers of zygotes, most of which disperse synchronously each year. The strongest find their way into the protective brood pouches of crusty adults who shed soft-shelled offspring at regular intervals (slowly developing zygotes die by the incompletely understood process of academic apoptosis). Juveniles develop a hard external carapace by intermittently joining and extracting themselves from other labs. The hardened but vulnerable sub-adults then join a common pool where they compete for space and position on rapidly eroding substrate in the universal aggregation. Many become dormant and fail to contribute to the gene (meme) pool. Some return to the lab as brood-rearing helpers. Few survive the rampant competition and frenzied cannibalism in the pool. Not all of the survivors are safe on the fragile substrate. A second apoptosis-like event eliminates the weak and meek. Only the most persistent or aggressive remain.

Superficially, intense selection in academe acts at the level of the selfish individual. Labs’ dominant adults are demanding parents who choose to raise only the best zygotes and thereby foster a tiny subset of potential offspring. Sibling rivalries intensify when resources run low, but selfish behaviors are policed rigorously by the brooding adults. Labs producing large numbers of conditioned offspring contribute more descendants than others. Although “individual success” is determined early in the life history, most of the variation in survivors’ fitness is among labs. Selection of future academics has the appearance of individual selection, but quite clearly occurs across levels where future success reflects the choices and traits of the dominant, and sometimes domineering, adults.

Some of the characters typically associated with zygote quality are misleading indicators, however, and the “best labs” fail to identify and implant all high-quality zygotes. The residual individuals enter labs with lower fitness, and thus handicapped, must adopt an alternative strategy in order to secure their place in academe. One of the successful alternatives is to blend enhanced development of secondary characters, such as communication skills and social parenting, with traits more typically associated with academic success. Although such a mixed strategy is likely to persist at low frequency, it nevertheless provides an opportunity to join the academic game and advance science. Regardless of strategy and stage of life history, all individuals will share a public good if they cooperate to improve knowledge and perception of their collective value.

REFERENCES

- Marshall, J.C., Buttars, P., Callahan, T., Dennehy, J.J., Harris, D.J., Lunt, B., Mika, M., Shupe, R. 2009. In the academic job market, will you be competitive? A case study in ecology and evolutionary biology. *Isr. J. Ecol. Evol.* 55: 381–392.
- Wilson, D.S., Wilson, E.O. 2008. Evolution “for the good of the group”. *Am. Sci.* 96: 380–389.

Douglas W. Morris
Department of Biology
Lakehead University
Thunder Bay, ON P7B 5E1, Canada
douglas.morris@lakeheadu.ca