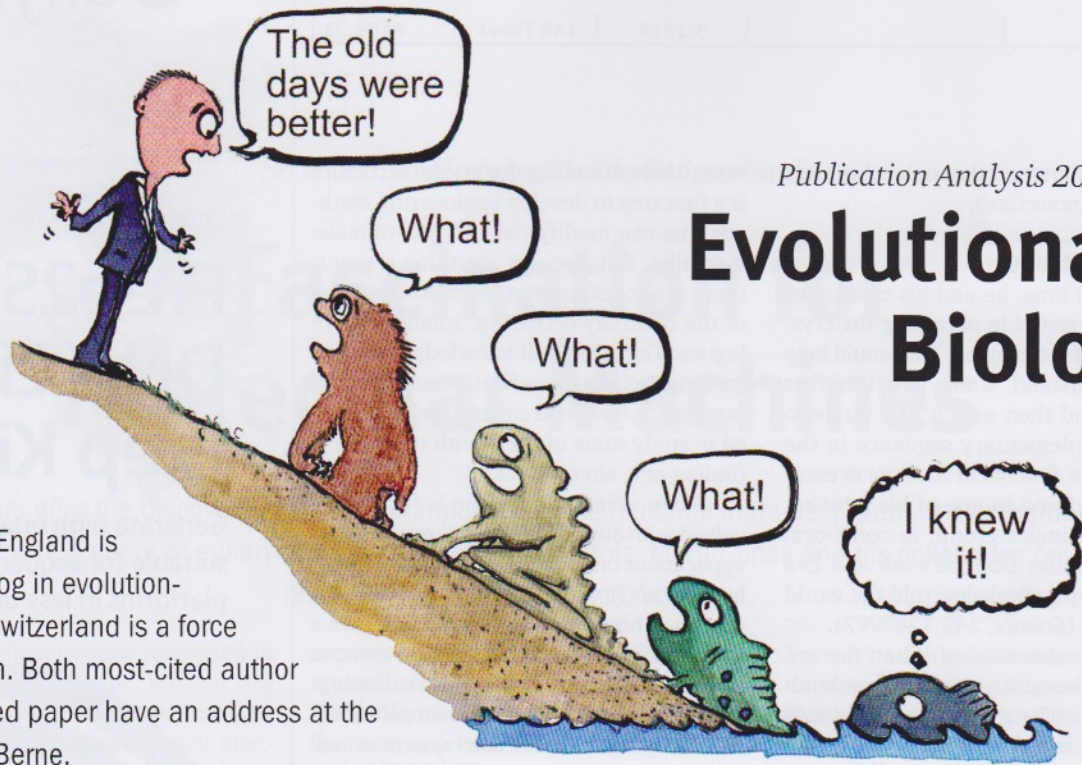


Publication Analysis 2005-2011

# Evolutionary Biology



Even though England is still the top dog in evolutionary biology, Switzerland is a force to reckon with. Both most-cited author and most-cited paper have an address at the University of Berne.

“**E**volution is a fact. Beyond reasonable doubt, beyond serious doubt, beyond sane, informed, intelligent doubt, beyond doubt evolution is a fact. (...) It is the plain truth that we are cousins of chimpanzees, somewhat more distant cousins of monkeys, more distant cousins still of aardvarks and manatees, yet more distant cousins of bananas and turnips... continue the list as long as desired.” So writes zoologist and best-selling author, Richard Dawkins, in his 2009 book “The Greatest Show on Earth: The Evidence for Evolution”. Despite his best attempts, his solid arguments for evolution, however, still fall flat with some people, especially overseas. In Europe, however, most people have long-accepted their kinships with worms and vegetables.

## Evolution of evolutionary biology research

At least since 1859, European scientists have devoted much of their time to the close observation of, first, ancient bones of extinct animals, then later, million-year-old DNA sequences to find out why there are so many species and how they are all related. Recently, the discipline has evolved itself and spawned a new sub-field called molecular ecology. “Molecular ecology represents a spectacularly successful example of cross-disciplinary science, in which the tools and methods of molecular biology, genomics and bioinformatics have been merged with the theory, concepts and approaches of organismal biology, including ecology, evolution, conservation and behaviour,” state the authors of ‘A Road Map for Molecular Ecology’ (*Mol Ecol*, 22(10):2605-26).

It might be a spectacle for science but, for us, performing a publication analysis in evolutionary biology, it raised a number of problems. Are all molecular ecologists automatically evolutionary biologists? Or are there different shades of molecular ecology? For the nations’ ranking, however, we didn’t yet have to think about those questions. Web of Science, the database we used for this analysis, coughed up a list of evolutionary biology specialist journals, which we used to determine the best-performing countries. Among these expert journals are, for example, *Systematic Biology*, *BMC Evolutionary Biology* and... you guessed it, *Molecular Ecology*.

Unsurprisingly, considering the country’s legacy in evolutionary biology, the top place is occupied by England. Although, England and runner-up, Germany, wrote almost the same number of articles, papers written in England gathered 30,000 citations more. One more surprise is Switzerland, scoring fourth place and the highest citation-per-article ratio. We will see later how Swiss scientists managed this feat. Interestingly, if we based our nations’ ranking on the citation-per-article ratio, Estonia (place 25 according to citations) would’ve been vice champion with 27.6 citations per article.

Worldwide, European evolutionary biologists outperformed their US-American colleagues in both the number of articles and citations (maybe the US is not the best place to study evolution anyway...). Australia, in fourth place, apparently is a top destination for evolutionary biologists with its unique flora and fauna. Quite a few researchers, who had been working in Europe, were drawn to the Southern hemisphere. Simon Ho, for example, worked in Oxford until 2007, and now is with the University of Sydney; Matthew J. Phillips, also formerly at Oxford, does his research in Brisbane and Loeske Kruuk is gaining work experience abroad at the Australian National University in Canberra but will be back at the University of Edinburgh in autumn this year.

## Top papers made in Switzerland

Before we reveal the most-cited authors in evolutionary biology, the top papers published between 2005 and 2011 deserve special attention. All of them describe computer software for population genetics or phylogenetic analysis. Also interesting, none of the papers were published in the usual publication top dogs, *Nature*, *Science* but in evolutionary biology expert journals. And even more remarkable, Swiss scientists were involved with three of the five top papers.

So, who are now the most-cited evolutionary biologists in Europe? As we already mentioned, the two disciplines evolutionary biology and ecology seem to be almost inseparably connected. Nothing in *ecology* makes sense except in the light of evolution, one could perhaps also say. But as ecologists have their own ranking, we tried to pick only those whose main focus is on evo-



lutionary biology. In fuzzy cases, we looked at the number of articles published in evolutionary biology expert journals. When a researcher published less than a third of his or her papers in those journals, we found them unfit for the race to the throne.

Two Swiss scientists, Laurent Excoffier (1<sup>st</sup>) and Jérôme Goudet (11<sup>th</sup>), made the top 30. Also, three scientists working in Belgium are among the most highly-cited authors of evolutionary biology papers: Yves van de Peer (2<sup>nd</sup>), Jean Swings (13<sup>th</sup>), Peter Vandamme (17<sup>th</sup>). Most evolutionary biologists work in the UK (7), Germany (6) and France (5).

So, what are they all working on? Broadly, one can identify four different specialties: computer models/software, evolutionary genomics/genetics, molecular ecology and systematics/taxonomy.

### Software, ancient DNA, social evolution and taxonomy

Our number one, Laurent Excoffier at the University of Berne, collected with his Arlequin "integrated software package for population genetics data analysis" almost 7,000 citations to-date. Also David Posada (3<sup>rd</sup>), Ziheng Yang (8<sup>th</sup>) and Oliver Gascuel (9<sup>th</sup>) spend most of their time in front of computers, developing computer models and new software.

In contrast, evolutionary geneticists like Svante Pääbo (4<sup>th</sup>), Eske Willerslev (19<sup>th</sup>), Johannes Krause (23<sup>rd</sup>), Janet Kelso (27<sup>th</sup>), the only woman in the top 30) and M. Thomas Gilbert (29<sup>th</sup>) turned their eyes and hands to old bones and DNA to find out more about our past. Andrew Rambaut (5<sup>th</sup>) and Oliver Pybus (6<sup>th</sup>) are more interested in the evolution of viruses and Remy Petit (25<sup>th</sup>) does his evolutionary biology studies on forest trees, like beech and oak.

More ecologically inclined evolutionary biologists include Tim Clutton-Brock (15<sup>th</sup>), who works amongst others on the evolution of animal societies and reproductive strategies, using meerkats and red deer as animal models. Stuart West (18<sup>th</sup>) wants to get to the bottom of the evolution of social behaviours like cooperation and altruism by studying parasitoid wasps, bacteria, fish, birds and mammals. Volker Loeschcke (20<sup>th</sup>) chose *Drosophila* as his study object to find out more about the fruit fly's thermal adaptation, inbreeding and stress response.

Last but not least, Pedro Crous (7<sup>th</sup>, fungi), Mark Chase (10<sup>th</sup>, plants), Jean Swings (prokaryotes), Peter Vandamme (prokaryotes), Vincent Savolainen (21<sup>st</sup>, plants) and Miguel Vences (24<sup>th</sup>, Madagascar amphibians and reptiles) are old school taxonomists, using the latest equipment to put the tree of life in correct order.

Right now, the balance between these four specialties is more or less even. But will molecular ecologists make up the entire top 30 in a future publication analysis of evolutionary biology? "The future of molecular ecology is bright. New genotyping and analytical tools are allowing us to address key questions and problems with a rigour that was not possible even a decade ago. Of greater importance, however, has been the training of a new generation of molecular ecologists with diverse skills - from field-work to computational biology to molecular functional studies. We are confident that this next generation of molecular ecologists has the conceptual and analytical skill sets to successfully respond to the challenges faced by our discipline," states the Road Map of Molecular Ecology optimistically. All this, will, most certainly, be revealed in a few years from now, when the next publication analysis comes round.

KATHLEEN GRANSALKE

## Europe...

Country	Citations	Articles	Cit./Art.
1. England	101,665	4,547	22.4
2. Germany	76,560	4,427	17.3
3. France	68,876	3,526	19.5
4. Switzerland	45,361	1,415	32.1
5. Spain	41,270	2,404	17.2
6. Sweden	33,391	1,597	20.9
7. Scotland	23,693	1,079	22.0
8. Netherlands	20,273	1,067	19.0
9. Italy	18,780	1,470	12.8
10. Belgium	16,751	1,079	15.5
11. Finland	16,444	749	22.0
12. Denmark	14,994	763	19.7
13. Austria	14,519	864	16.8
14. Norway	13,261	652	20.3
15. Russia	10,133	1,421	7.1
16. Portugal	9,801	621	15.8
17. Czech Rep.	9,177	648	14.2
18. Ireland	7,557	306	24.7
19. Israel	6,370	473	13.5
20. Wales	6,137	270	22.7

Articles appearing between 2005 and 2011 in 'Evolutionary Biology' journals as listed by *SCImago* and Thomson Reuters' *Web of Science*. The citation numbers are accurate as of March 2014. A country's figures are derived from articles, where at least one author working in the respective European nation is included in the authors' list. Israel is included because it is a member of many European research organisations and programmes (EMBO, FP7 of the EU...).

## ... and the World

	Citations	Articles	Cit./Art.
Europe	395,191	22,710	17.4
USA	347,437	15,962	21.8
Canada	70,452	3,102	22.7
Australia	57,790	3,169	18.2
Japan	53,432	2,541	21.0
China	30,029	3,960	7.6
South Korea	10,585	1,053	10.1





## Publication Analysis 2005-2011 – Evolutionary Biology

## Most Cited Authors...

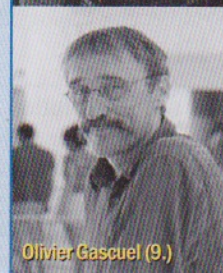
	Cit-ations	Art-icles
1. <b>Laurent Excoffier</b> , Ecol & Evol, Univ Bern	11,729	55
2. <b>Yves van de Peer</b> , Plant Syst Biol, VIB-Univ Ghent	8,656	105
3. <b>David Posada</b> , Biochem Genet Immunol, Univ Vigo	7,776	63
4. <b>Svante Pääbo</b> , MPI Evol Anthropol, Leipzig	7,365	72
5. <b>Andrew Rambaut</b> , Evol Biol, Univ Edinburgh	6,051	50
6. <b>Oliver G. Pybus</b> , Zool, Univ Oxford	5,629	80
7. <b>Pedro W. Crous</b> , Microbiol, Univ Utrecht	5,498	165
8. <b>Ziheng Yang</b> , Genet Evolut Environ, Univ Coll London	5,004	43
9. <b>Olivier Gascuel</b> , Comput Biol, Univ Montpellier	4,838	35
10. <b>Mark W. Chase</b> , Jodrell Lab, Royal Bot Gardens, Kew	4,790	125
11. <b>Jérôme Goudet</b> , Ecol & Evol, Univ Lausanne	4,242	33
12. <b>Anders Pape Møller</b> , Ecol System Evol, Univ Paris-Sud	4,076	197
13. <b>Jean Swings</b> , Microbiol, Univ Ghent (emerit)	3,574	113
14. <b>Axel Meyer</b> , Evol Biol, Univ Konstanz	3,496	109
15. <b>Tim Clutton-Brock</b> , Zool, Univ Cambridge	3,408	97
16. <b>Pierre Taberlet</b> , Alp Ecol, Univ Grenoble	3,400	72
17. <b>Peter Vandamme</b> , Microbiol, Univ Ghent	3,379	138
18. <b>Stuart A. West</b> , Zool, Univ Oxford	3,333	73
19. <b>Eske Willerslev</b> , Nat Hist Mus Denmark, Univ Copenhagen	3,259	82
20. <b>Volker Loeschcke</b> , Genet Ecol Evol, Univ Aarhus	3,181	141
21. <b>Vincent Savolainen</b> , Life Sci, Imp Coll London	3,130	60
22. <b>Juha Merilä</b> , Biosci, Univ Helsinki	3,087	129
23. <b>Johannes Krause</b> , Archaeol Sci, Uni Tübingen	3,068	25
24. <b>Miguel Vences</b> , Evol Biol, Techn Univ Braunschweig	3,034	152
25. <b>Remy J. Petit</b> , BIOGECO, Univ Bordeaux	3,006	39
26. <b>Vincent Laudet</b> , Funct Genom, Univ Lyon	2,967	77
27. <b>Janet Kelso</b> , MPI Evol Anthropol, Leipzig	2,960	26
28. <b>Hans Ellegren</b> , Evol Biol, Univ Uppsala	2,917	81
29. <b>M. Thomas P. Gilbert</b> , Nat Hist Mus Denmark, Univ Copenhagen	2,885	79
30. <b>Arne Traulsen</b> , MPI Evol Biol, Plön	2,779	64



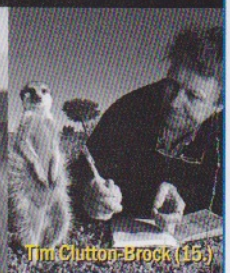
Laurent Excoffier (1.)



Oliver Pybus (6.)



Olivier Gascuel (9.)



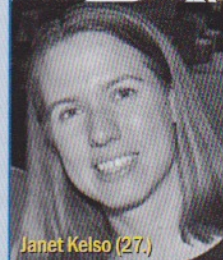
Tim Clutton-Brock (15.)



Stuart West (18.)



Juha Merilä (22.)



Janet Kelso (27.)



Hans Ellegren (28.)

Citations of articles published between 2005 and 2011 were recorded up until March 2014 using the Web of Science database from Thomson Reuters. The "most-cited papers" had correspondence addresses in Europe or Israel.

## ... and Papers

	Citations
1. <b>Excoffier, L; Laval, G; Schneider, S</b> Arlequin (version 3.0): An integrated software package for population genetics data analysis. <i>EVOLUTIONARY BIOINFORMATICS</i> 1:47-50 2005	7,185
2. <b>Evanno, G; Regnaut, S; Goudet, J</b> Detecting the number of clusters of individuals using the software STRUCTURE: a simulation study. <i>MOLECULAR ECOLOGY</i> 14(8): 2611-2620 JUL 2005	3,492
3. <b>Posada, David</b> jModelTest: Phylogenetic model averaging. <i>MOLECULAR BIOLOGY AND EVOLUTION</i> 25(7): 1253-1256 JUL 2008	3,159
4. <b>Yang, Ziheng</b> PAML 4: Phylogenetic analysis by maximum likelihood. <i>MOLECULAR BIOLOGY AND EVOLUTION</i> 24(8): 1586-1591 AUG 2007	2,172
5. <b>Stamatakis, A; Hoover, P; Rougemont, J</b> A Rapid Bootstrap Algorithm for the RAxML Web Servers. <i>SYSTEMATIC BIOLOGY</i> 57(5): 758-771 2008	1,995