Progress Updates on the ISZS/IUBS International Research Program:
Biological Consequences of Global Change (BCGC)

December 2014: Alain Roques, a member scientist in the BCGC program edited a book entitled "Processionary moths and climate change: An update". The book is published by Springer and it contains 427 pages written by 101 authors from 22 different countries.

November 2014: A symposium on BCGC was held at the 6th International Symposium of Integrative Zoology (ISIZ) 24–25 November 2014 in Beijing. 10 scientists from China, Norway and Netherlands delivered oral presentations on animal population and wildlife borne diseases under global change. The ISIZ was co-organized by ISZS, IOZ, CAS and China National Committee for International Union of Biological Sciences (CCIUBS). The Sponsors and Supporters were Bureau of International Cooperation, CAS; Department of International Affairs, China Association of Science and Technology (CAST); Department of Society Affairs and Academic Activities, CAST; Department of Life Science, National Natural Science Foundation of China (NSFC); Department of Forest Management, State Forest Administration of China (SFA); China Zoological Society; International Union of Biological Sciences (IUBS); and John Wiley & Sons, Inc.

August 2014: A symposium on BCGC was held during the 5th International Conference on Rodent Biology and Management (ICRBM) on 25 August 2014 in Zhengzhou, China. 13 scientists from 7 countries (Canada, Israel, New Zealand, Tanzania, China, South Africa and Norway) delivered oral presentations on BCGC at the symposium. Professor Zhibin Zhang, leader of the BCGC program, delivered a plenary lecture on “Large-scale manipulative experiments reveal accumulative effects of livestock grazing on Brandt’s vole populations in stepped grassland” right after the opening of the Conference. The 5th ICRBM was organized by the Institute of Zoology (IOZ), Chinese academy of Sciences (CAS); China National Committee for International Union of Biological Sciences (CCIUBC) and Zhengzhou University, and it was supported by the International Union of Biological Sciences (IUBS); Bureau of International Cooperation, CAS; Department of International Affairs and Department of Society Affairs and Academic Activities, China Association for Science and Technology; Department of Life Science, National Natural Science Foundation of China.

October 2013: Dr Zhibin Zhang delivered presentation on BCGC at the Annual Meeting of the Ecological Society of China 17-19 October 2013, Nanchang, Jiangxi provice, China.

September 2013: The 4th International Symposium Borok-IV with the theme of Invasion of Alien Species was held in Borok, Russia 22-28 September 2013 within the framework of the BCGC program supported by both IUBS and ISZS. Over 100 scientists from 16 countries attended the meeting. Dr. Zhibin Zhang, the

BCGC program leader, Vice-President, IUBS and President, ISZS, and Dr. Yury Dgebuadz, a member of the BCGC program Committee, Vice-President, IUBS, were at the meeting. Both of them delivered oral speeches at the symposium on their scientific research on alien species and the BCGC program.

June 2013: The program organized a BCGC Workshop at the Grassland Ecosystem Research Base of IOZ, CAS in Xilinhot, Inner Mongolia, China, 29–30th June 2013. 15 scientists from 6 countries attended the Workshop. Haiqing Chen, Secretary General of the Xilingol Government; Fusheng Li, Head of Xilingol Forestry Department; Xiang Bao, Head of Xinlingol Grassland Station; and Liguo Hong, Head of Xinlinhot Pastures attended the Workshop. Participants of the Workshop also visited the Xilinhot Field Research Station of Plant Protection Institute, the Agricultural Academy of Sciences, China.

June 2013: An ISZS Institutional Member meeting was held on 29th June 2013, Beijing, China. Chunxu Han, the ISZS Secretary General delivered a special presentation on the BCGC program.

June 2013: The ISZS had its 5th International Symposium of Integrative Zoology was held 25–28th June 2013 in Beijing, China. The theme of the symposium is “Biological Consequences of Global Change (BCGC).” Chunxu Han, the ISZS Secretary General delivered a special presentation on the program. Nearly 100 scientists from 13 countries attended the Symposium and over 50 people reported their research on BCGC. Yaping Zhang, Vice President and Academician at CAS, Yingnan Liang, Deputy Director, Department of International Relations at China Association for Science and Technology (CAST), Le Kang, Director of IOZ and Academician at CAS, and Nathalie Fomproix, Executive Director of the International Union of Biological Sciences (IUBS) spoke at the Opening Ceremony, chaired by Zhibin Zhang, Professor at IOZ, CAS, President of ISZS and Vice President of IUBS. Other honourable guests at the ceremony included John Buckeridge, President Emeritus of ISZS and honorary Editor-in-Chief of Integrative Zoology (INZ), the official journal of ISZS; Jean-Marc Jallon, Immediate Past President of ISZS; Abrahan Haim, Vice President of ISZS; Yoshitaka Nagahama, Vice President of ISZS; Ronghui Su, Deputy Director General of Bureau of Major Research and Development Programs, CAS; Jinghua Cao, Deputy Director General of Bureau of International Cooperation, CAS; Jianhui Jin, Bureau of Planning, CAS; Xiaobo Ren, Bureau of Major Research and Development Programs, CAS; Zhenliang Yu and Ling Chen, Life Science Division, China National Natural Science Foundation, and many others.

June 2013: The program organized and published another special issue on BCGC in journal, *Integrative Zoology* (8.2), edited by Zhibin Zhang. The published articles are:

Biological Consequences of Global Change: past and future (page 123); Zhibin ZHANG; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12043
Applying various algorithms for species distribution modeling (pages 124–135); Xinhai LI and Yuan WANG; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12000
Biological consequences of global change for birds (pages 136–144); Anders Pape MØLLER; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12006
Review and synthesis of the effects of climate change on amphibians (pages 145–161); Yiming LI, Jeremy M. COHEN and Jason R. ROHR; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12001
Climate warming increases biodiversity of small rodents by favoring rare or less abundant species in a grassland ecosystem (pages 162–174); Guangshun JIANG, Jun LIU, Lei XU, Guirui YU, Honglin HE and

Zhibin ZHANG; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12027
Experimental evaluation of reproductive response to climate warming in an oviparous skink (pages 175–183); Hongliang LU, Yong WANG, Wenqi TANG and Weiguo DU; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12025
Influence of geography and climate on patterns of cell size and body size in the lizard Anolis carolinensis (pages 184–196); Rachel M. GOODMAN, Arthur C. ECHTERNACHT, Jim C. HALL, Lihan D. DENG and Jessica N. WELCH; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12041
Extreme developmental temperatures result in morphological abnormalities in painted turtles (Chrysemys picta): a climate change perspective (pages 197–208); Rory S. TELEMECO, Daniel A. WARNER, Molly K. REIDA and Fredric J. JANZEN; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12019
Artificial nesting habitats as a conservation strategy for turtle populations experiencing global change (pages 209–221); John P. WNEK, Walter F. BIEN and Harold W. AVERY; Article first published online: 4 JUN 2013 | DOI: 10.1111/1749-4877.12042

21 September 2012: Zhibin Zhang, leader of the program, delivered a plenary speech on BCGC at the Annual Meeting of Mammal Sub-Society of China Society of Zoology held at Shenyang Normal University, Liaoning province, China

3 September 2012: At the 21st International Congress of Zoology held at the University of Haifa, Israel, the program organized a section on BCGC. Chunxu Han, assistant leader of the program, presented an introduction and progress on the program. Zhibin Zhang, leader of the program, delivered a research presentation on “Agricultural irrigation mediates climatic effects and density dependence in population dynamics of Chinese striped hamster in North China Plain.” Xinhai Li, another assistant leader of the program, presented his research on “Climate change and human impact caused retreat on large mammals in ancient China.”

July 2012: At the 31st IUBS General Assembly at the Taihu Lake International Conference Center in Wuzhong, Suzhou, Jiangsu, China, Zhibin Zhang, Leader of the program, did a presentation on the program and proposed to the GA to renew the program for another 3 years, i.e. next triennium. In the end, also based on the recommendations of the IUBS "Scientific Program Committee," the General Assembly adopted the proposal and proved unanimously to implement the BCGC program for the next triennium (2013-2015).

5 July 2012: The program organised a symposium of Biological Consequences of Global Change (BCGC) + Integrative Climate Change Biology (iCCB) on 6 July 2012 during the 31st IUBS General Assembly and Conference on Biological Sciences and Bioindustry at the Taihu Lake International Conference Center in Wuzhong, Suzhou, Jiangsu, China. The symposium organizers are Zhibin Zhang and Nils Chr. Stenseth. The speakers, as well as the titles of their speeches, are set out as below:
John Buckeridge: Barnacles (Cirripedia: Thoracica) - tenacious opportunists who have demonstrated extraordinary adaptive resilience to environmental change
David B. Wake: Direct and Indirect Effects of Anticipated Climate Change on Amphibians
Thomas E Martin: Climate change influences on trophic interactions that affect breeding bird and plant communities
Jussi Eronen: Mammal traits and environment: Molar tooth crown height and precipitation
David Nogués-Bravo: Why we do not have mammoths in our backyard? Species extinctions under climate

change
Chuan Yan: Climate and irrigation affect the population dynamics of Chinese striped hamster in North China Plain
Hari Sharma: Biological consequences of climate change on arthropod diversity, pest management, and food security
Klara Lokos Toth: The climate as a natural resource on the yield stability of wheat
David Polly: Traits, habitats, and changing climates: ecometrics and vertebrate locomotion
Simon Morley: Using regions where biodiversity and ocean warming hotspots overlap to predict physiological responses to climate change
Brian Helmuth and Mackenzie Zippay: Forecasting sublethal impacts of climate change in marine ecosystems: sometimes the details make all the difference
Mikael Forteilus: Retrospective on the iCCB Programme: how it came to be and why
Raimundo Real: The pure effect of climate on species distribution
Xinhai Li: Applying species distribution models in climate change studies
Tom Oliver: Promoting resilience or accommodating change? Aims for site and landscape management under a changing climate

June 2012: The program organized and published another special issue on BCGC in journal, *Integrative Zoology* (7.2), edited by Zhibin Zhang. The published articles are:
Biological consequences of global change: opportunities and challenges, *Zhibin ZHANG*
Adélie penguins and temperature changes in Antarctica: a long-term view, Craig D. MILLAR, Sankar SUBRAMANIAN, Tim H. HEUPINK, Siva SWAMINATHAN, Carlo BARONI and David M. LAMBERT
Direct impacts of climatic warming on heat stress in endothermic species: seabirds as bioindicators of changing thermoregulatory constraints, *Stephen A. OSWALD and Jennifer M. ARNOLD*
Opportunism and the resilience of barnacles (Cirripedia: Thoracica) to environmental change, *John S. BUCKERIDGE*
Is the expansion of the pine processionary moth, due to global warming, impacting the endangered Spanish moon moth through an induced change in food quality? *Charles-Edouard IMBERT, Francis GOUSSARD and Alain ROQUES*
Global climate change is confounding species conservation strategies, *Harold KOOPOWITZ and Bradford A. HAWKINS*

June 2012: SUMMARY OF THE PROGRAM REVIEW RESULT BY H. TAKEDA: BCGC (Biological Consequences of Global Change): The scientific merit and outcome of the programme (2 workshops and 9 publications) have been well appreciated by the reviews. The theme is highly topical and strategic for the community and IUBS. The programme has become influential through the international training course organized and broad communication with EC members and scientists from China, Russia, India and so on, and further expansion can be expected in the near future. Furthermore, there are some suggestions made as to the collaboration with UNESCO and think-tank function together with iCCB. Financially the programme has been well supported by other organizations, which is an ideal situation of the IUBS scientific program in that the IUBS grant should be a seed. **Overall this programme is considered as the core of IUBS scientific programmes.**

October 2011: The program had a Sino-Russian Symposium on Amur Tiger Conservation in Hunchun, Jilin

Province, China, 19-21 October 2011. 21 scientists from Russia and 45 from China attended the meeting. 29 scientists and specialists delivered speeches about their work and research concerning the Amur tiger, an endangered species, in this cross-border region, including the tiger's ecology, behaviour, genomics and diseases. Prof. Fuwen Wei, Prof. Jianghua Sun and Dr Yan Xie the program were at the symposium.

August 2011: An International Training Course on New Trends and Methodology on Animal Ecology and Conservation Biology was held by the program with an aim to promote new theories, changes, and developments in methodology of animal ecology along with new technologies in the field. Over one hundred young scientists from more than thirty developing counties attended the training. Over 10 professors from the world, including Prof. Fuwen Wei and Dr Yan Xie in the program, delivered lectures at the course.

August 2011: The program organised a Workshop on wildlife –borne Diseases Control and Management in Asia-Pacific Region in cooperation with the Bureau of Life Sciences and Biotechnology, Chinese Academy of Sciences (CAS); Department of Wildlife Conservation and natural Reserve Management, State Forestry Administration (SFA), China; and Wildlife Services, Animal and Plant Health Inspection Service, United States Department of Agriculture (USDA). Over 50 scientists and mangers from 13 countries and region around the Asia-Pacific rim, including the program leader, Zhibin Zhang, came and attended.

March 2011: In 2010 *Integrative Zoology* (SCI-Medline-indexed; ISZS' official journal) published a special issue on BCGC. According to Wiley-Blackwell's (journal publishers) annual report, 9 of the top 10 most downloaded articles were from the BCGC special issue. The article 'Climate change and invasive species: double jeopardy' was the top downloaded article from *Integrative Zoology* in 2010, receiving 696 full text downloads. The article 'Some biological consequences of environmental change: A study using barnacles (*Cirripedia: Balanomorpha*) and gum trees (Angiospermae: Myrtaceae)', also published in the special issue, was featured on BBC Earth News.

March 2011: In cooperation with the Chinese National Committee for MAB Programme, the program organized a training workshop on "Climate Change and Biosphere Reserves in China" on March 30-31, 2011 at North China Electrical Power University. 17 representatives from 12 biosphere reserves in China and 6 experts from the International Society of Zoological Sciences (ISZS), the Chinese National Committee for the International Union of Biological Sciences (CCIUBS), Ms. Sarah Quig from Canadian Biosphere Reserves Association, and more than 30 graduate students participated in the training workshop.

December 2010: A special workshop on the BCGC program was held over the 4th International Symposium of Integrative Zoology in Kunming, the capital city of Yunnan province, southwestern China. Over 20 scientists attended and Dr Yan Xie delivered a presentation on the progress of the program mad in the last 3 years. Discussions were followed and consensuses were reached in the end. It is widely accepted that in the last three years, considerable progresses were made within the framework of the program. To follow up in the program, a scientific committee has to be formed and different working groups are to be set up. At the same time, specific research proposals are to be called for, a mechanism of information exchange and sharing is to be established, and a special database is consolidated. It is agreed that the qualified research proposals have to be funded with seed funds and a program paper is to be composed and released to the authorities and public concerned.

December 2010: The ISZS had its 4th International Symposium of Integrative Zoology 4-6 in Kunming, China. The theme of the symposium is “Biological Consequences of Global Change (BCGC) – Data Analysis and Sharing” and the focus of the symposium was on how to collect and analyze data for global change research so that the scientists from around the world can work together to plot out a practical approach to establish a working mechanism for international data analysis and information sharing. Dr. Yan Xie, the ISZS Secretary General and also a scientist in the program, delivered a special presentation on the program. Over 120 researchers from 16 countries attended the symposium and the scientists in the program, Dr. Yury Dgebuadz, Dr Elena Kotenkova, Dr Liudmila Khlyap,Dr Alian Roques, Dr Hari Sharma, James Spotila, Dr Yiming Li and Dr Xinhai Li, delivered oral speeches on their scientific research in the program.

October 2010: An international symposium with the theme of Invasion of Alien Species was held in Myshkin, Russia 5-9 October 2010 within the framework of the BCGC program. About 100 scientists from 13 countries attended the meeting. Dr. Zhibin Zhang, a BCGC program leader, was a Co-President of the symposium and Dr. Yury Dgebuadz, also a BCGC program leader, was Vice President of the Scientific Committee of the symposium. Dr. Nathalie Fomproix, Executive Director, IUBS, also attended the symposium. Mr. Chunxu Han, coordinator of the BCGC program, delivered a presentation on the BCGC program. Scientists in the program, Dr. Yury Dgebuadz, Dr Jianghua Sun, Dr Yiming Li and Dr Xinhai Li, delivered oral speeches at the symposium on their scientific research in the program.

June 2010: Dr. Fuwen Wei, a leading scientist in the Program, presented a progress report to the Chinese Academy of Sciences (CAS). The presentation included a synopsis of recent BCGC work on the impact of climate change on biodiversity and endangered species as well as bio-disasters in Asia, Europe, Australia and America. The CAS is satisfied with the progresses made in the Program and has guaranteed its continued support. In addition, the IUBS has approved a €15,000 grant for the implementation of the BCGC Program in 2010.

June 2010: The program organized and published a special issue on BCGC in journal, *Integrative Zoology* (5.2), edited by Nils Chr. Stenseth. The published articles are:
The Biological Consequences of Global Change. *Nils Chr. STENSETH*
Ecometrics: the traits that bind the past and present together. Jussi T. ERONEN, David P. POLLY, M FRED, J DAMUTH, DC FRANK, V MOSBRUGGER, Christoph SCHEIDEGGER, Nils Chr. STENSETH and Mikael FORTILEUS
Climate change and invasive species: double jeopardy. *Susan A. MAINKA and Geoffrey HOWARD*
Climate Optimum rejuvenates the Mediterranean marine world. Francis Dov POR
Some biological consequences of environmental change: a study using barnacles (Cirripedia: Balanomorpha) and gum trees (Angiospermae: Myrtaceae). *John BUCKERIDGE*
Direct impacts of recent climate warming on insect populations. Christelle ROBINET and Alan ROQUES
Effects of Temperature and Hydric Environment on Survival of the Panamanian Golden Frog Infected with a Pathogenic Chytrid Fungus.Heidi M. BUSTAMANTE, Lauren J. LIVO and Cynthia CAREY
Climate change induced range shifts of Galliformes in China. Renqiang *LI, Huidong TIAN, and Xinhai LI*
A multi-scale approach to understanding climate effects on offspring size at birth and date of birth in a reptile. *Chloé D. CADBY, Geoffrey M. WHILE, Alistair HOBDAY, Tobias ULLER and Erik WAPSTRA*

March 2010: The ISZS submitted an application to the National Natural Science Foundation of China

(NNSFC) to raise more funds to support the BCGC program. At the same time, the number of researchers in the program increased from 7 to 15. The new researchers are David B. Wake at the Graduate School at the University of California, Berkeley, USA; Yury Yu. Dgebuadze at the Institute of Ecology and Evolution, the Russian Academy of Sciences; Alain Roques at the French National Institute for Agricultural Research, France; Hari C. Sharma at the International Crops Research Institute for the Semi-Arid Tropics, India; Bernard Cazelles at the Université Pierre et Marie Curie in Paris, France; Boris I. Sheftel, Senior Scientist, the A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences; Jianghua Sun, Yiming Li and Xinhai Li at the Institute of Zoology, the Chinese Academy of Sciences, China. (For details, please refer to the Researcher Profiles at the end of this update).

January 2010: The ISZS completed a concept plan for constructing an online working platform and database for scientists in the BCGC program to communicate and share research.

October 2009: Representatives from the ISZS made a presentation on the ISZS international research program – Biological Consequences of Global Change - at the Workshop on Integrated Climate Change Biology (an IUBS scientific research program granted in 2006) before the 30th General Assembly of the International Union of Biological Sciences (IUBS) in Cape Town, South Africa. Afterwards, Dr. Zhibin Zhang submitted a proposal to integrate the ISZS international research program – Biological Consequences of Global Change – into the IUBS programs. In the end, also based on the recommendations of the IUBS "Scientific Program Committee," the General Assembly adopted Dr. Zhang's proposal and named the Biological Consequences of Global Change (BCGC) program a new IUBS International Scientific Program with Drs. Zhibin Zhang (China), Yury Yu. Dgebuadze (Russia) and Hari Sharma (India) appointed as leaders. Resolutions also passed that the IUBS would provide some seed funds to support the program.

12 July 2009: Dr. Yan Xie, the ISZS Secretary General, delivered a speech at a workshop on climate change at the 2009 International Congress for Conservation Biology in Beijing, introducing the ISZS international research program – Biological Consequences of Global Change.

9 July 2009: The ISZS had a special workshop on the ISZS international research program – Biological Consequences of Global Change. Jean-Marc Jallon, Vice-President, International Union of Biological Sciences (IUBS); Rosa Polymeni, Professor, Section of Zoology and Marine Biology, Professor, Department of Biology, University of Athens, Greece; Nils Chr. Stenseth, Professor, Centre for Ecological & Evolutionary Synthesis (CEES), Department of Biology University of Oslo, Norway; Alain Roques, Director, Zoology Forestry, French National Institute for Agricultural Research; Jeffrey A. McNeely, Chief Scientist, IUCN (International Union for Conservation of Nature); Abraham Haim, Professor, Biology and Geography, University of Haifa, Israel; Yan Xie, Associate Professor, Institute of Zoology, Chinese Academy of Sciences, China; Zhibin Zhang, Professor, Institute of Zoology, Chinese Academy of Sciences, China; and John Spotila, President, The Global Cause Foundation, were at the workshop. Consensuses were reached that climate change is happening and effecting biological species around us and biological consequences of global change are important to our future. However, these scientists concluded that current research on biological consequences of global change is insufficient. As a result, international research programs, such as ISZS program for biological consequences of global change, are necessary and timely.

8 July 2009: The ISZS had its 3rd International Symposium of Integrative Zoology (ISIZ) in Beijing with the theme “Biological Consequences of Global Change.” Over 130 scientists and researchers from over 25 countries in the world attended the symposium. Eighty-three attendees delivered academic speeches and presentations on biological consequences of global change and related scientific topics. The ISZS Secretary General, Dr. Yan Xie, delivered a special presentation on the ISZS international research program – Biological Consequences of Global Change at the opening session of the symposium.

7 July 2009: The ISZS had an online visual conference with the United States National Science Foundation (NSF) on the ISZS international research program – Biological Consequences of Global Change. The NSF is interested in the program and expressed its strong intent to support the program.

June 2009: John Buckeridge presented an overview of how marine conditions in Australasia are reflected in changes to barnacle fauna. He also expressed that he would very much like scientists in Asia to complement this research with data from their region. In particular, he is interested in marine systems. The objectives are to use the past to model the likely future marine conditions.

March 2009: The ISZS worked with the IUBS and integrated the international symposium of biological consequence of climate change with the IUBS program Darwin 200 Symposium, with the theme of biological consequence of climate change.

February 2009: In order to put the program into action, the ISZS planned an international symposium with a focus on the biological consequence of climate change to be held from 8 to 10 July 2009 in Beijing.

January 2009: The ISZS had a meeting at the IOZ China to introduce and promote the program. Dr. John Buckeridge and Dr. Mauricio Lima Arce sent over research progress on the program to the ISZS Secretariat. Dr. Yan Xie, Secretary General, ISZS, delivered a presentation on the progress of the program at the meeting. Representatives from CAS, CAST, TNC, CI, IFAW and Peking University were at the meeting. They all expressed their support for the program and would like to integrate their work in the program where possible.

December 2008: The ISZS produced a Call for Expressions of Interest to participate in the program and disseminated it to potential researchers and co-sponsors. Dr. Anwar Tumur, College of Life Sciences and Technology, Xinjiang University, China, and Dr. Igor Khorozyan from Armenia, wrote to the ISZS to confirm their willingness to participate in the program. The Earth and Oceanic Systems Research Group, at RMIT University, Australia, expressed their interest to integrate their research into the program.

October 2008: The Chinese Academy of Sciences set the ISZS research program as a Key International Cooperation Program and granted RMB900,000 (USD130,000) in seed funding.

August 2008: The 20th International Congress of Zoology (ICZ) was held in Paris, France. Dr. Zhibin Zhang delivered a speech on the program at the General Assembly of the ISZS. A resolution was passed that “the ISZS will be the coordinating body and all are invited to participate.”

June 2008: The Biological Consequences of Global Change research program was established. Seven

leading scientists from five countries across five continents indicated their interest to participate in the program. They are Nils Chr. Stenseth from the University of Oslo, Norway; Kung-sik Chan from the University of Iowa, USA; Mauricicio Lima Arce from Pontificia University, Chile; John Buckeridge from RMIT University, Australia; and Zhibin Zhang, Fuwen Wei and Yan Xie from Chinese Academy of Sciences, China.

→ Table of Researchers

Name	Location	Species	Methods	Data
John Buckeridge	Australia/ South Pacific	barnacles	sample collecting morphology anatomy biogeography evolution	descriptive modeling
Kung-Sik Chan & Nils Chr. Stenseth	Canada & Norway	lynx & cod	time series analysis (intervention analysis)	long-term observation records
Mauricio Lima	Chile	mice & small rodents	matrix model	long-term observation records
Fuwen Wei	China	giant pandas	molecular biology DNA Sequencing	molecular, descriptive
Yan Xie	China	many	biodiversity research	descriptive, observation records
Zhibin Zhang	China	biological, agricultural disasters or pests	laboratory field	behavioral, physiological, population
David B. Wake	USA	salamanders, amphibians, reptiles	sample collecting morphology, biodiversity informatics	descriptive, observation
Yury Yu. Dgebuadze	Russia	fish fauna fish	laboratory, field, risk assessment, modelling	long-term observation records
Alain Roques	France	forest insects	laboratory, field	Molecular, descriptive
Hari C. Sharma	India	crop insects	laboratory, field	behavioural, physiological, population
Bernard Cazelles	France		biomathematics and modelling	long-term observation records

Boris I. Sheftel	Russia	small mammals, shrews	laboratory, field	long-term observation records
Jianghua Sun	China	forest insects	laboratory, field	Molecular, descriptive
Yiming Li	China	amphibians, vertebrate species	biodiversity research, laboratory, field	descriptive, observation records
Xinhai Li	China	birds, avian species	sample collecting morphology spatial dynamics and modelling	descriptive, observation records
Liudmila A. Khlyap	Russia	small mammals	sample collecting morphology spatial dynamics and modelling	descriptive, observation records
Elena Kotenkova	Russia	biodiversity, invasions, phylogeny, ethology of rodents	sample collecting morphology spatial dynamics and modelling	descriptive, observation records
Abraham Haim	Israel	environmental physiology and chronobiology	field laboratory	descriptive, observation records
Jürgen Heinze	Germany	evolution of group structures and reproductive tactics in social insects	field laboratory	functional genomic analyses
Sarita Maree	South Africa	biology and molecular systematics	field laboratory	molecular phylogenetics, phylogeography and conservation

→ Researcher Profiles

John Buckeridge: Natural resources engineering, environmental ethics, marine biology and palaeobiology. Dr. Buckeridge works on barnacle species and other marine invertebrates (e.g. poriferans) from Australasia and the South Pacific; his research is composed of two parts – the description and distribution of new and extant species and the study of the fossil record.

His recent research on climate change, and the diversity and distribution of cirripedes has shown that the

group is at risk on both local and regional scales, and that the species that inhabit polar regions (Antarctic) will be the first to suffer due to loss of their hosts with warming seas. However, in the past, some species appear to have adapted to the changes in the pH of the oceans, and thus survived.

Mauricio Lima: Population biology, time series analysis, capture-mark-recapture statistical models, population model with age structure and stage structure, complex dynamical system (chaos), impacts of climate change (mainly focused on rainfall). Dr. Lima mainly researchers small mammals in South America (especially Chile) and his studies make conclusions about how climate change effects populations and behaviour, density-dependence in population dynamics, and system feedbacks.

From his research, it is demonstrated the influence of NAO index on the population dynamics and spatial synchrony of aphids, and the relationship between the two. Research results find out that most of them are nonlinear. To be more specific, the key elements determining population fluctuations in green spruce aphid populations are non-linear feedback structure, high potential for population growth and weather condition in winter and next spring.

Nils Christian Stenseth: Population biology ecology and genetics, large-scale ecological pattern and evolution pattern, impacts of climate change (ecological and evolutionary). Dr. Stenseth utilizes long term data series on Canadian lynx, Norway cod, Pollock and locusts and through models examines dynamical behaviour (non-linearly, density dependent, disturbance) of systems and how climate change and human activity affect populations.

Kung-Sik Chan: Expert in time series analysis, chaos, stochastic differential equations and statistical ecology. Dr. Chan is a mathematician by training and his work on ecology has been conducted with Nils Chr. Stenseth (see above). Dr Chan's work is in two main methods - one is to create a new way to analyze problems and test these against data; the second is to focus on the impacts of climate change.

Zhibin Zhang: Head of the Research Group of Animal Ecology in Agriculture and the director of the State Key Laboratory of Integrated Management on Pest Insects and Rodents, China. Dr. Zhang's research interests include animal populations, ecology and management, as well as biodiversity, ecosystem function and theoretical biology.

Fuwen Wei: Head of the Key Laboratory of Animal Ecology and Conservation Biology. Dr. Wei's research is aimed at achieving a scientific understanding of the ecology of rare and endangered animals, effective conservation, and sustainable utilization of wildlife resources.

Yan Xie: Director of the China Program of the Wildlife Conservation Society. Dr. Xie's research interests are biodiversity conservation, invasive species, vegetation restoration, and bio-geographic divisions.

David B. Wake: Professor at the Graduate School at the University of California, Berkeley. His scientific interest covers evolutionary biology; genetics, ecology, speciation, systematics and biogeography of salamanders, especially those in the New World tropics. His main research activities are functional, developmental and evolutionary morphology of amphibians and reptiles, biodiversity and conservation biology, conservation strategies, declining amphibian populations, and biodiversity informatics.

Yury Yu. Dgebuadze: Deputy Director at the Institute of Ecology and Evolution of the Russian Academy of Sciences. His scientific interests are biodiversity, ecology, biological invasions, fish fauna, speciation and fish ecology and conservation. Professor Dgebuadze's current research activities include risk assessment of biological invasions in the inland waterways of Europe, Stochastic and deterministic mechanisms structuring aquatic communities invaded by alien species, animal evolution and animal morphology and ecology.

Alain Roques: Director at French National Institute for Agricultural Research, France. As a forest entomologist, Dr. Roques has 31 years of experience in the biology, ecology and behavior of forest insects. His present research activities focus mainly on the effect of global warming on the expansion of forest insect populations, ecology and management of invasive insect species.

Hari C. Sharma: Principal Scientist of Entomology at the International Crops Research Institute for the Semi-Arid Tropics. Professor Sharma has made significant contributions in the areas of crop protection and crop improvement covering insect bio-ecology and ecology, biological control, natural pesticides, insect resistant varieties, transgenics, and bio-safety of transgenic crops to non-target organisms. Currently his main research activities include insect-resistant varieties, applications of biotechnology in pest management, ecological controls, and plant protection.

Bernard Cazelles: Professor at the Université Pierre et Marie Curie in Paris, France. He is a specialist in biomathematics and modeling. Currently, his main research activities include nonstationarity in ecological and population systems, nonlinearity and stochasticity in population dynamics, chaos in biology and modeling self-purification in polluted waters and streams.

Boris I. Sheftel: Senior Scientist, the A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences. Currently, his main scientific interests lay in the field of population dynamics, structure of small mammal populations and interrelations between relative species, especially the ecology, systematic and morphology of shrews. He has performed long-term field investigations of small mammal populations for the last 37 years at the Yenisei ecological Station in Central Siberia and, from 2000 onwards, he has been doing similar investigations at the Khonin-Nuga Biological Station in Northern Mongolia on Southern border of taiga climatic zone.

Jianghua Sun: Assistant Director at the Institute of Zoology at the Chinese Academy of Sciences in Beijing, China. His is also a professor at The State Key Laboratory of Integrated Management of Pest Insects and Rodents. Professor Sun's scientific interest covers chemical ecology and invasion biology of forest invasive insects IPM of forest insects. His research activities focus mainly on understanding evolutionary process between host tree and invasive forest insect pest through chemical ecology and molecular analysis, studying invasion biology of forest invasive insect pests and developing monitoring and control technologies based on semiochemicals for those invasive species. Recently, Professor Sun has also investigated the impact of climate change on interactions between soil/host tree/insect pest and forest health.

Yiming Li: Professor at the Institute of Zoology at the Chinese Academy of Sciences in Beijing, China. His scientific interests include biology, animal ecology, conservation biology and biological invasions caused by climate change. Professor Li's current research activities include hydroelectricity production and forest

conservation in watershed, human influences on bullfrog invasion in China and threats to vertebrate species in China and the United States.

Xinhai Li: Associate Professor of the Institute of Zoology at the Chinese Academy of Sciences in Beijing, China. He is also the curator of the Biodiversity and Evolution Section of National Zoological Museum of China. Dr. Li's scientific interests include landscape ecology, ecological modeling and statistics. Currently his research activities focus mainly on the spatial dynamics of avian influenza transmission, species distribution and adaptation, systematic conservation planning and climate change.

Liudmila A. Khlyap: Senior researcher, A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences. Liudmila's scientific interests include biodiversity and biological invasion. The focus of her current research is medical zoology, small mammals, pest management and commensal rodents, especially the influence of natural and anthropogenic factors on spatial distribution within large regions (Russia and adjacent territories), including urban and agricultural lands.

Elena Kotenkova: Senior researcher, A.N. Severtzov Institute of Ecology and Evolution, Russian Academy of Sciences. Elena's scientific interests include biodiversity, biological invasion, phylogeny and ethnology of rodents. Currently, she has her research focus on investigating *Mus musculus* superspecies complex.

Abraham Haim: professor, Faculty of Science, University of Haifa, Israel. As a specialist in environmental physiology and chronobiology, Prof. Haim has published over 150 papers in scientific reviewed journals. He has supervised many graduate students, young leading scientists in academia and research institutes in Israel and beyond. Among his important scientific achievements is the first study showing that the blind mole rat is actually not blind, but seasonal acclimatization of the thermoregulatory system functions through changes in photoperiod. His focus is on the negative impact of light pollution on animals.

Jürgen Heinze: professor, Biologie I, Universität Regensburg, Germany. As a specialist is in evolutionary biology and zoology, Prof. Heinze investigates the evolution of group structures and reproductive tactics in social insects. He and his team showed that societies of ants are often not harmonious super organisms, in which all cooperate to increase the fitness of the society as a whole. Instead, societies appear to be structured by complex networks of mutual manipulation and policing. Individuals attempt to pursue their own interests at the cost of others, which leads to aggression and punishment. The seemingly smooth functioning of society relies on a well-balanced compromise between individual and group interests. Currently, their research is complemented by functional genomic analyses as well.

Sarita Maree: a postdoctoral research fellow in the Department of Zoology & Entomology and Department of Genetics, University of Pretoria, South Africa. Specializing in biology and molecular systematics, Maree's research revolves around molecular phylogenetics, phylogeography and conservation of African small mammals. She is the author or co-author of 10 peer-reviewed research papers and 5 popular articles, as well as 4 technical and 22 specialist reports. She has presented her research at 16 international and 14 local conferences and participated in many radio and television interviews. Since 2003, she has been a member of the IUCN Species Survival Commission's Afrotheria Specialist group and is actively involved in the conservation of Africa's highly threatened golden mole species.

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