

IUBS REPORT OF ACTIVITIES

FOR THE TRIENNium JANUARY, 2004- MAY 2007

The present report on IUBS Activities covers the period since the last General Assembly in January, 2004, in Cairo, Egypt. It is intended to assist the 29th General Assembly in its deliberations. This document reports on the ways that some of the resolutions of the previous Assembly were implemented, and includes brief reviews of the IUBS scientific programmes, publications, and collaborative scientific activities undertaken with the Union's members and partners.

1. IUBS SCIENTIFIC PROGRAMS AND ACTIVITIES

During this triennium, the main focus of the Union was on its scientific programmes, particularly on the Integrative Biology, Biodiversity, Biological Education, and Bioethics programmes. The following consists of a brief account of the progress towards their implementation. For each of these programmes, a brief summary is given, with more detailed information provided in the annexes. Further insight into some of these programmes and their prospects will be presented by the programme leaders during the General Assembly in Washington, DC, USA.

1.1. INTEGRATIVE BIOLOGY (IB)

1.1.1 Introduction

The IB Programme aims to promote integrative trans-disciplinary approaches to research and education in the biological sciences. Integrative science bridges disciplines, and works within and across levels of biological organization and across diverse taxa over periods of time, short (physiological) and long (evolutionary). It can deal with complex questions by summoning a diversity of expertise. Integrative approaches offer much that most current practices do not. Integration facilitates the generation of new hypotheses and new questions because representatives of an array of expertise communicate extensively. A 'competitive advantage' can thereby emerge because of the ability of such research teams to generate both data and resources faster and more multi-dimensionally than can practitioners of the single-focus model of research. Most importantly, the science can be more innovative by providing new ideas, approaches, and insights. Integrative science is based on a set of principles that include:

- (1) the delineation of complex questions;
- (2) the organization of expertise to tease apart the questions hierarchically [reductionistic approaches, the comparative method, taxa, etc., retain significant places in a hierarchical and flexible/adaptable approach];
- (3) the exploration of several levels of the hierarchy of biological organization;
- (4) extensions of expertise into non-traditional arenas; and
- (5) development of new educational/training modes cannot be construed simply by presenting examples of integrative biology.

1.1.2 Criteria for inclusion of activities in the Integrative Biology Program under the IUBS umbrella.

There are too many ideas of what integrative biology might be, and even definitions of 'integrative biology', so we must be explicit about a definition and the principles if we are to make conceptual headway. Therefore, we state criteria for inclusion of activities in the Integrative Biology Programme under the IUBS umbrella. The criteria include:

- 1 An introductory and/or summary commentary about the nature of integrative biology must be part of any activity sponsored or co-sponsored by IUBS as part of the IB programme.
- 2 IB activities include symposia, workshops, training sessions, etc., but must be broadly construed intellectually so that they reflect the tenets of integrative biology, and broadly representative of the diversity of the appropriate science, as well as geographic and other components.
- 3 Sponsorship of IB activities will be granted by the IB Steering Committee, whether IUBS funds are involved or not, in accord with the principles stated herein.
 - a. Specific themes for each year's activities will be formulated by the Steering Committee so that the programme has coherence rather than the appearance of being 'random' activities.
 - b. Proposals for sponsorship and/or support of IB activities should include a *one-page description of the event that addresses its topic as well as the criteria listed below, a list of potential participants and their specific topics, and, if necessary, a budget*. Criteria for sponsorship/support include:
 - 1.) Reflection of principles of integrative biology,
 - 2.) Potential new insights or syntheses to be gained via the activity,
 - 3.) Engagement of a diversity of participants in terms of science, geography, gender, age, etc.
 - 4.) Provision for follow-up, including a dissemination strategy (publication, website, etc.),
 - 5.) Provision of an education/training component.
 - c. Funding requests will be assessed by the Steering Committee; in most cases, IUBS funds would provide 'seed' or 'matching' support, rather than full funding.
 - d. Proposals should be sent to the IUBS Secretariat (secretariat@iubs.org), and the Steering Committee chair, M. H. Wake (mhwake@socrates.berkeley.edu).

1.1.3 Symposia, Workshops and Publications

The IUBS Integrative Biology programme to date has sponsored symposia and workshops that illustrate the value of integrative approaches to such areas as: identity and complexity; stochastic phenomena; seasonality and episodic events; stress biology; interactions between species; alternative reproductive strategies, and others.

Since the adoption of the Programme in November, 1997, a large number of IUBS Integrative Biology symposia and workshops were organized as follows:

1. Following a series of planning meetings that took place in 1998, the first symposium entitled "Towards an Integrative Biology" was convened by Prof. M. Wake, within the framework of the Annual Meeting of the American Association for the Advancement of Science (AAAS), on 22 January, 1999, in Anaheim, California, USA.
2. IUBS Workshop on "Integrative Biology Approaches to Study Episodic Events in Watershed Systems" held on 10-12 June, 1999, in San Pedro, Brazil (see report in *Biology International* N° 38).
3. IUBS Workshop on the "Biology of Stress Responses" was held on 15-18 October, 1999, at Tongji Medical University, Wuhan, China (see report in *Biology International* N° 38).
4. IUBS Symposium on "Alternative Reproductive Strategies" was held on 26-28 November at Shonan Village, Hayama, Japan (see report in *Biology International* N° 38, and *The Journal of Reproduction and Development*, vol. 46, Supplement March 2000).
5. IUBS Workshop on "Integrative Biology Education" organized within the framework of the IUBS/UNESCO BioEd 2000 Conference held on May 15-18, 2000, in Paris, (see *Biology International* N° 39, July 2000).
6. IUBS Symposium "Biological Sciences: Challenges for the 21st Century" was organized within the framework of the IUBS General Assembly in November, 2000, in Naples, Italy. Its main focus was Integrative Biology. A quote from Professor François Gros' 'Opening Remarks' illustrates the importance of integrative biology concepts, approaches and themes, " ... *I am convinced that the majority of people present in this room share the view that the 21st century will be the century of "integrative biologists," that is to say, of ... biologists trained in such a way as to span different levels of biological organisations, of the complex hierarchy of the living world, and perhaps extend to non-biological realms*".
7. IUBS Symposium "Promise of Integrative Biology" was organized by John Pearse and Marvalee Wake on 3 January, 2002, at Anaheim, USA, within the framework of the annual meeting of the American Society of Integrative and Comparative Biology (SICB). The Proceedings were published in *Integrative and Comparative Biology*, (formerly *American Zoologist*) Volume 43, Number 2, April 2003.
8. IUBS Symposium "Integrative Biology and Complexity in Natural Systems" was held at the UNESCO Headquarters, Paris, on 27-29 May, 2002.
9. IUBS Symposium on "Integrative Approaches to Biodiversity Conservation and Management: the Human Dimensions" was held on 30 Sep.-2 Oct., 2002, following the ICSU General Assembly, in Rio de Janeiro, Brazil. The Symposium was organized by IUBS and the Universidad Federal de Rio de Janeiro (UFRJ), and co-sponsored by IGU, the Brazilian Academy of Sciences and the Ministry of Environment (MMA), of Brazil, and the Centre National de la Recherche Scientifique (CNRS), Institut National de Recherches Agronomiques (INRA), Institut de Recherches pour le Développement (IRD), and Université de Paris VI, France.
10. The 3rd IUBS Workshop on "Stress Proteins in Natural Populations and Environment" was held on 12th September, 2003, in Quebec, Canada.
11. IUBS Symposium on "The Biology of Learning and Education" was held on 25-27 November, 2003, at Shonan Village, Hayama, Japan.
12. IUBS Symposium on "Biological Significance of Stochastic Events" followed on 28-30 Nov., 2003.

13. International Workshop on "Stress Proteins in Natural Populations and Environment" during The Second International Congress on Stress Responses in Biology and Medicine (Organized by the Cell Stress Society International, Tomar, Portugal, 24-28 September 2005).
14. IUBS Symposium on "Integrative Biology of Reproductive and Social Behaviours" was held on 5-8 Oct., 2005, at le Domaine de Saint-Paul, Saint-Rémy-lès-Chevreuse, France. The Symposium was co-sponsored by the French Committee for IUBS.
15. IUBS Symposium on "Environmental Factors, Cellular Stress and Evolution" held at Banaras Hindu University, Varanasi, India , October 13-15, 2006, and organized by Professors Subhash C. Lakhotia, Martin E. Feder , and Sree K. Apte.

The following publications related to the IUBS Programme are available online on the IUBS website:

- « Towards An Integrative Biology (TAIB) Program”, *Biology International*, 3-9, 37 (1999).
- « Towards An Integrative Biology (TAIB) Programme Activities 1999”, *Biology International*, 1-11, 38 (2000).
- “Stress Biology – A Paradigm for Integrative Biology”, *Biology International*, Issue N° 40. January, 2001. 48 pages.
- « Biological Sciences – Challenges for the 21st Century” *Biology International*, Issue N° 41. Edited by Giorgio Bernardi, Jean-Claude Mounolou, Talal Younès. 2001. 100 pp.
- « Integrative Biology and Complexity in Natural Systems: Keys to Addressing Emerging Challenges”. *Biology International* Issue N° 44. (2003). Edited by Robert Barbault, Jean-François Guégan, Motonori Hoshi, Jean-Claude Mounolou, Marvilee Wake and Talal Younès. 91 pp.
- “The Promise of Integrative Biology”. A symposium organised by John Pearse and Marvilee Wake on 3 January, 2002, at Anaheim, USA, and published in *Integrative and Comparative Biology* (formerly the *American Zoologist*) Vol. 43, Number 2, April 2003.
- « Integrative Biology: The Nexus of Development, Ecology, and Evolution”. By Prof. Marvilee H. Wake,
- *Biology International*, Issue N° 46 (online) included several brief Reports of IB Symposia on “Stress Proteins in Natural Environment and Populations”, by Prof. Subhash Lakhotia, and on “Biology of Learning” and “Stochastic Events” by Prof. Motonori Hoshi
- "Integrative Biology of Reproductive and Social Behaviors". Abstracts available online.
- The “*International Symposium on Environmental Factors, Cellular Stress and Evolution*”, on 13-15 October, 2006 at BHU in Varanasi, India (Proceedings are available online (<http://www.ias.ac.in/jbiosci/contents.htm>)).

Referring to the decisions made at the IB Scientific Steering Committee meeting in January, 2006, to support 3-4 proposals on Integrative Biology, the Officers agreed to make provisional funds to support such proposals. The Officers noted with interest the potential availability of three proposals that will be presented to the IB SSC, as follows:

- Symposium on “*Monitoring the Effectiveness of Nature Conservation*” to be submitted by Prof. Christoph Scheidegger. This conference is to be held on September 3-6, 2007, at the Swiss Federal Research Institute WSL, Switzerland.
- International Workshop/Training Workshop on “*Modelling of Tropical Amazonian Ecosystems (Modélisation des Ecosystèmes Tropicaux et Amazoniens)*”, by Dr. Patrick Silan on behalf of the French Committee of IUBS and Intecol. The project will take place 22-31 October, 2007, in Cayenne, French Guyana.
- International Symposium on “*Integrative Biology of Ageing and Senescence*” to be developed by Prof. Erwin Beck, to take place in Germany, 2007-2008.

1. 2. BIODIVERSITY

During the period 2004-2007, the IUBS activities related to biodiversity have included the following:

1.2.1 Diversitas Program

The IUBS, a founding member and co-sponsor of DIVERSTAS is represented by Prof. Christoph Scheidegger on the IUBS Co-sponsors and Scientific Steering Committees.

1.2.2 Participation at the International Conference “Biodiversity Science and Governance”

The International Conference on “Biodiversity Science and Governance”, held in Paris on 24-28 January, 2005, was organized by the French Ministry of Higher Education and Research, and Diversitas, and co-sponsored by UNESCO, UNEP, FAO, the World Bank, the European Commission, IUCN, and IUBS.

The conference consisted of 4 plenary sessions on Challenges of biodiversity, science and governance; Global diversity, current status and trends; Social, economic and ecological value of biodiversity; and Biodiversity and living resources management. The Conference also included a large number of workshops and side events. IUBS contribution consisted of attending the planning sessions/meetings, co-convening a workshop on “Integrative Biology Approaches to Biodiversity” and participation in the follow-up meetings. A key result of the Conference was the introduction of biodiversity in the agenda of the G-8 Summit Conference, and plans are underway for the establishment of an International Mechanism of Scientific Expertise on Biodiversity (IMOSEB), an IPCC-like body, to provide biodiversity global assessments and evaluations to governments and UN bodies. Eventually, Diversitas might be considered to serve as a backbone for such a body. For more information, visit IMOSEB website (<http://www.imoseb.net>).

1.2.3 Collaboration with the Convention on Biological Diversity (CBD)

Concern regarding collaboration between IUBS and CBD was expressed at the Cairo General Assembly. It can be summarized as “*a need was present to help CBD attain closer contact with the wider scientific community and IUBS could be a good bridge for that gap*”.

Discussion between the CBD and IUBS Executive Directors resulted in the signature of a “Memorandum of Cooperation” between the two organisations (Annex 2).

Consequently, IUBS participated in the 8th Conference of the Parties (COP8) on 20-31 March, in Curitiba, Brazil. Also, at the invitation of the Brazilian Government, the IUBS cosponsored the International Conference “Biodiversity – The Megascience in Focus” organised on 15-19 March, 2006, in Curitiba in collaboration with a number of Brazilian academic organisations concerned with biodiversity. An Executive summary and the recommendations of the Conference were presented at a special event that took place within the framework of COP8 (Annex 3).

1.2.3 Human Dimension of Biodiversity

The proposal “*A Prospectus for an International Programme on Human Dimensions of Biodiversity Change*” was prepared by Prof. Kamal Bawa on behalf of the USNC for IUBS as a follow up of the IUBS Workshop on “Human Dimensions of Biodiversity: Grand Challenges” organized by the US National Committee for IUBS, on 5-6 October, 2003, at the Keck Center for the Academies, in Washington D.C., USA (Annex 4).

The IUBS Executive Committee welcomed the proposal, noting that the key questions, research priorities and hypotheses that are important to IUBS are also of interest to a number of other organisations concerned by biodiversity. IUBS would provide a grant to be determined by the Officers at a later date, as a seed fund, taking into consideration the contribution of other partners.

1.2.5 Systematics Agenda-International

Following the IUBS co-sponsored symposium “Assembling the Tree of Life” a genuine interest was expressed to further develop the IUBS Programme “Systematics agenda-International”. Following the Curitiba Symposium in March, 2006, a proposal entitled “BioGenesis” was endorsed by Diversitas as a core project chaired by Prof. M. Donoghue.

1.3. Bioethics

Following the recommendations of the last General Assembly, the IUBS Bioethics Committee was reformed and Prof. John Buckeridge was appointed as its new Chairman. The main activities of the Committee were the development of a website and its participation in the UNESCO International Bioethics Committee (IBC) and World Commission of the Ethics of Science and Technology (COMEST) (See Annex 5).

1.4. Biological Education

The main activity of the IUBS Commission for Biological Education was the organization of the “*Conference BioEd-2004: Biology, Sustainable Development, Ethics and Citizenship*”, which was held on 13-18 September, 2004, in Rio de Janeiro, Brazil, and the planning for two BioEd meetings: the first one to take place in June, 2008 in France, and the Second in 2009, in New Zealand.

The conference BioEd 2004 was co-sponsored by UNESCO, UNEP, IUBS, and the National Academy of Sciences, USA. Brazilian co-sponsors included the Brazilian Academy of

Sciences, the National Council for Scientific Research (CNPq), the Foundation Oswaldo Cruz, and the Brazilian Association of Biology Teachers. According to Prof. Hoshi and Dr. Younès, the conference was a success because firstly, the majority of the participants (1300) were young researchers, biology teachers and science education experts coming from Brazil and Latin American countries; and secondly in integrating scientific, educational, cultural, and artistic dimensions (theatre, music, dance and painting) to convey messages related to sustainable development, ethics, and citizenship (Information available on the IUBS website)

Regarding IUBS-CBE future activities, the main focus of CBE will be biological education activities to serve sustainable development, pursuing its collaboration with UNESCO, within the framework of the UN Decade for Education towards Sustainable Development.

2. IUBS PUBLICATIONS

Conforming with the recommendations of the GA in Cairo, 2004, the IUBS publications activities were reviewed and moved online. IUBS website (www.iubs.org) has been remodelled and all issues of Biology International are now available online.

Prof. John Buckeridge was appointed to be the new Editor of Biology International.

3- GOVERNANCE & ADMINISTRATION

3.1. IUBS Executive

Two Executive Committee meetings were held: the first one followed the General Assembly in Cairo, Egypt, on 22 January, 2004, and the second at the IUBS Secretariat in Paris on 3-4 October, 2005, France. A third meeting of the Executive Committee will be held prior to the 29th General Assembly in Washington D.C., USA, on 8 May, 2007. In addition, the IUBS Officers had several meetings, held on different occasions, with the last two held on 12-13 October, 2006, at Banares Hindu University, Varanasi, India, and on February 1, 2007, in Paris.

3.2. IUBS Governance and Administration

Given that Dr. Talal Younès, Executive Director, will retire in January 2009 after 29 years of service to the Union, and aware of the potential that modern IC technologies have brought to the office work environment, and with the pending relocation of the Secretariat offices, the IUBS Officers decided to establish an *ad hoc* Committee on 'IUBS Management and Governance'. The committee is composed of Profs. Wake (Chair), Kunio Iwatsuki and John Buckeridge (members). The mandate to the committee is to review current approaches to organisation and management within the ICSU family and more broadly, and to make proposals regarding management and the relocation of the Secretariat.

4. COLLABORATION WITH OTHER ORGANIZATIONS

4.1. Collaboration with IUBS National Organisations

IUBS collaborative activities with its Ordinary Members take different forms reflecting the great diversity of national contexts, needs and priorities. During the period 2004-2007, these activities included the following:

Spain: Support provided to the publication of a Manual for Systematists, edited by Rafael Zardoya, Spain (In Spanish).

- France:
 - Co-sponsorship of the Integrative Biology Symposium, in Saint Rémy les Chevreuses (See item 1.1.3 -13- above).
 - Participation at the International Conference on Biodiversity, Science, and Governance, held in Paris (See item 1.2. above).
- Brazil:
 - Co-sponsorship of BioEd 2004 in Rio de Janeiro (See item 1.4 above).
 - Co-sponsorship of the Biodiversity Conference in Curitiba (See item 1.2.3 above).
- Italy:
 - Collaboration in the organisation of the International Symposium entitled “Science and Today’s Visions of the World” held on 11-13 March, 2005, at the Palazzo Franchetti, in Venice, Italy. The Symposium was convened by Prof. Giorgio Bernardi, Chairman of the Italian Committee for IUBS, in collaboration with the UNESCO Regional Office for Europe (ROSTE), *Istituto Veneto di Scienze, Lettere ed Arti*, and Anton Dohrn Zoological Station in Naples, Italy, and the co-sponsorship of IUBS, *Acaemia Europea* and the International Society of Molecular Evolution. More than 50 participants attended the Symposium, including from IUBS: Profs Motonori Hoshi and Marvalee Wake, and Dr Talal Younès. Also among the participants, there were four Noble Laureates. Commenting on the Symposium, Prof. Hoshi said he was “*very pleased with the representation at this meeting, which brought together all types of scientists, psychologists, musicians and mathematicians*” and that “*this is a meeting one will remember for a lifetime*”.
 - Participation in Evaluation of the Anton Dohrn Zoological Station of Naples (IZN).
- India:
 - Symposium on Integrative Biology and Stress, BHU, Varanasi (See item 1.1.3 -14- above).
- Botanical Congress
 - Within the framework of “The International Botanical Congress”, which took place in Vienna in 2005, the IUBS co-sponsored and supported a Symposium on “Conserving Biodiversity: Ethical, Political and Scientific Challenges”.

4.3. Collaboration with ICSU and UNESCO

Prof. Hoshi and Dr. Younès participated in the ICSU General Assembly, 22-29 September, 2005 in Shanghai, China, and the ICSU Unions’ meeting, including that of the Bio-unions,

held on 23-24 April, 2007, in Rome, at which a special session was convened by IUBS to discuss the prospects for declaring an international year of biology.

During the period 2004-2007, Prof. Wake co-chaired the Inter-Union Programme on “Science for Health and Well-being”, (Annex 6), and participated in the meetings of the ICSU Scoping Group on Health. Prof. Hoshi participated in the meeting of the ICSU CSCR in 2007, and the meetings of the ICSU Regional Office in Asia, which were held in Kuala Lumpur, Malaysia and Tehran, Iran.

IUBS participated in the meetings of the following UNESCO Programmes and Committees:

- a) The MAB International Coordinating Council (T. Younès and V. Neronov); and
- b) The Council meeting of the International Network of Biosphere Reserves (T. Younès).
- c) The International Bioethics Committee (John Buckeridge), and
- d) The International Committee on Ethics of Science and Technology (CEST) (John Buckeridge).

5 - ANNEXES

Annex 1 : Integrative Biology Report by Prof. Marvalee Wake.

Annex 2 : “Memorandum of Cooperation” between IUBS and CBD.

Annex 3 : Report of the International Symposium “Biodiversity, The Megascience in Focus.”

Annex 4 : “Human Dimensions of Biodiversity: Grand Challenges” by K. Bawa.

Annex 5 : Report of the IUBS Bioethics Committee, by Prof. John Buckeridge.

Annex 6 : Report of the ICSU Inter-Union Programme “Science for Health and Well-Being”