International unions concerned about biodata

Action must be taken now to ensure that data are safely archived and always accessible.

Sir — The guaranteed and sustained public availability of primary, fundamental, experimental scientific data is a matter of considerable concern. Such data include (but are not exclusive to) nucleotide sequences of biological organisms, amino-acid sequences of proteins, three-dimensional structures of biological molecules, and other data produced by genomics and proteomics studies.

In Correspondence (*Nature* **417,** 222; 2002), D. Agosti and N. F. Johnson stress the importance of open access to taxonomic data, noting that the situation for basic taxonomic data is much worse than for genomic data. But even for genomic and structural data there are no internationally agreed mechanisms for ensuring continuing open access to data, and no strict rules for their deposition in public archival databases. These pressing issues have recently been considered by the Inter-Union Bioinformatics Group (IUBG), which contains, under the umbrella of the International Council for Science (ICSU), representatives from several international unions: the International Union for Pure and Applied Biophysics, the International Union of Biochemistry and Molecular Biology, the International Union of Pure and Applied Chemistry, the International Union of Crystallography and the ICSU Committee on Data for Science and Technology. The IUBG report of May 2002 is available at http://md.chem.rug.nl/~berends/IUBG-FinalReport.html or via www.IUPAB.org.

In the fields of genomics, proteomics and macromolecular structures, the primary scientific data, which form an essential part of a scientific publication, are not included in detail in publications, but are deposited in databases. It has always been the practice that those who claim scientific advances in their published work support their claim by making the objective data on which their claim is based openly available. Therefore, such data must be available on at least the same basis as the publication itself, if the common standards of scientific integrity are to be maintained.

The databases concerned are at present maintained by institutions that do not have the support status of national libraries. It is not yet generally recognized at government level that the archiving of such data needs protection similar to the archiving of literature; the responsibilities to maintain the collections and safeguard their integrity and access into the distant future are not clearly defined and internationally agreed.

The IUBG report contains four explicit statements and seven recommendations. It recommends: first, that the international scientific unions identify key archival databases and have an active role in standardization; second, that publishers require authors to deposit their primary data in a key archival database; third, that funding agencies insist on such deposition and actively support primary-data repositories; and fourth, that legislators ensure that laws on intellectual property rights allow the fair use of data for scientific and educational purposes.

The aim of the IUBG report is to stir up the scientific community worldwide. The US government has taken the lead by supporting GenBank and the Protein Data Bank, but the maintenance of archival databases is a supranational activity. At present there are different models for funding various databases and there are different funding models in the United States, Europe and Japan. None has an explicit long-term commitment. The obligation to deposit data must be followed worldwide. There must be a single international archive for each class of data, even if it is distributed over more than one site, and data must remain uniform in format. There is an urgent need for international agreements to stabilize the situation and to guarantee cooperation, consistency and funding.

Jean Garnier*, Herman J. C. Berendsen†
**INRA Centre de Recherche de Versailles, Unité de Mathematique, Informatique et Genome, RD 10 (route de Saint-Cyr), 78026 Versailles Cedex, France*
†Department of Chemistry, the University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands

Feeding the world

Sir — Your "Food and the Future" Insight[1] discusses problems of and prospects for agriculture. In the overview article, Anthony Trewavas (pages 668–670 of ref. 1) argues that agricultural technologies have averted and will continue to avert malthusian crises in which the human population exceeds its food supply. Trewavas writes: "The lessons of history are clear. Successive lurches in population number have driven the development of new agricultural technologies designed to provide food for growing populations."

There are, however, other perspectives. An alternative analysis[2] shows that the development of new agricultural technologies has been driven by increasing corporatization and economic integration of agricultural processes and products, particularly in the twentieth century when the most spectacular increase in human population size occurred. During this time, famine resulted not from a global or even (according to some perspectives) local shortage of food[3–5], but from poverty and lack of political power among starving people.

Trewavas discusses concerns about how the projected nine billion people that will inhabit the Earth later this century will be fed. Even today's food supply would suffice if cultural preferences could be changed to reduce meat consumption substantially. This change could, in principle, free more than 40% of the world's grain to feed people rather than livestock[6]. But feeding people receives a lower priority in the current food system than does the profit to be made from the global spread of luxury diets — most of which have deleterious effects on both human and ecosystem health[7].

We require agricultural practices that are more hospitable to native biodiversity than are the industrial methods that prevail today[8]. The three challenges of agriculture are: to feed everyone well; to safeguard biodiversity; and to provide a decent living for those who produce food. These goals are neither incompatible nor imaginary. From urban gardens in Cuba, to shade-coffee farms in Mexico, to grass-fed beef from Minnesota, to community-supported agriculture supplying food to downtown New Yorkers — some ecologically and economically innovative farmers and consumers are attempting to reshape the food system to emphasize sustainability over production.

Catherine Badgley
Museum of Paleontology, 1109 Geddes Road, University of Michigan, Ann Arbor, Michigan 48109-1079, USA

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