Eurodiabeta: Information technology in health care

Myriad are the ways in which information technology is changing the way we live and work. While the tremendous impact advances in computer and communication technologies have had on the way more and more people rur their homes and offices not only in the advanced countries but also in the affluent sections of the developing world is well known, the role information technology can play in specialized professional fields such as health care delivery is not so widely recognized.

In what could prove to be the beginning of a great revolution, computers are now being introduced into clinical practice. Several institutions—including hospitals, universities and industries—from six European countries have jointly established a Europe-wide scheme aimed at improving the care of people with diabetes, which afflicts 6.5 million Europeans and over 100 million people worldwide. Launched on 10 January 1990 at London's St Thomas hospital, the programme, called Eurodiabeta, brings together physicians, scientists and software engineers from 15 centres under the European Commission's Advanced Informatics in Medicine initiative.

The heart of the new programme is a computer-based information system which will allow general practitioners and nurses instant access to specialist knowledge on how to manage the patients. Details of the condition and each patient's history and treatment routine will form part of the information system that can be accessed through the Europe-wide computer network by doctors and nurses.

Patients themselves would eventually be feeding data about their condition directly into the system, through handheld recorders, and in turn receive advice on diet and other areas of lifestyle.

The idea behind Eurodiabeta is to provide effective care at the appropriate level—at the patient's home, GP's clinics and hospitals—and reduce the necessity for specialist referrals. That way not only would the patients benefit but the overall expenditure on their treatment and care can be reduced. Besides, there are not enough specialists to go around. According to St Thomas Hospital's Prof. Peter H. Sonksen, a key actor in the Eurodiabeta project, computerized knowledge and decision support about diabetes, linked to information about each patient, would help general practitioners 'practice medicine at a much higher level'.

When the new system becomes fully operational, say in the next three or four years, scientists at St Thomas Hospital expect that half of the 5000 diabetes-related amputations that take place in Britain each year could be prevented, bringing an annual saving of more than £200 million. Other severe complications, including liver failure, blindness and premature death among victims, cound also be curtailed to a great extent, they say.

Although diabetes has been chosen to demonstrate the concept, similar information systems could be created to deal with cancer, renal failure, blood pressure disorders, heart diseases and other chronic diseases.

India—with her crowded hospitals, overworked doctors and a pathetically low physician-to-patients ratio—can surely benefit from the introduction of information technology-based programmes in health care delivery. To begin with, the Indian Council of Medical Research, the National Informatics Centre and possibly the Department of Biotechnology may commission a pilot study.

These are easier said than done. Even in the traditional areas where information technology came on in a big way in the West—such as information retrieval by scientists—we have been rather slow. In addition, none of the initiatives taken so far—the batch-mode service offered by INSDOC, the UGC-backed service run by the Indian Institute of Science, and the NIC–ICMR Biomedical Information Service—is being used to anywhere near the optimal level, let alone these services being cost-effective. (Incidentally, this pathological indifference to information and the consequent inability of a majority of Indian scientists to garner and use relevant information from the far corners of the world are at the root of much of our science being mediocre.)

It is all the more reason then we should not hope for quick results when we eventually decide and go in for a sophisticated information system as an integral part of health care delivery in India.

Subbiah Arunachalam, Publications and Information Directorate, CSIR, New Delhi.

Entomology research in India: Thrust areas for the future

A seminar on the above theme was held on 5 March 1990, at the Entomology Research Institute, Madras. It was attended by several experts in diverse fields of entomology, for purposes of making a critical assessment of the future trends of entomological research and identify thrust areas. Dr M. S. Swaminathan, delivering the keynote address emphasized the need for involvement of meteorology in entomology, more particularly in predicting pest outbreaks and integration of this information in terms of the number of multiple crop rotation programmes. Linkage between entomologists and nutritionists and also the involvement of the genetic engineering, biotechnology, biochemistry in today's entomological studies were also suggested by him.

In his presidential address Dr S. Ramachandran, Secretary, Department of Biotechnology, New Delhi, highlighted the necessity of involving molecular biological tools in entomological studies such as transmembrane signalling, molecular level interactions of cell surfaces and also emphasized the need for deve-

loping cost effective production technologies. He also indicated the need for an integrated approach to entomological studies involving ecologically more balanced and environmentally sustainable agents in insect control.

Shri T. N. Seshan, Member, Planning Commission (Science), delivering the inaugural address highlighted the management issues of scientific problems involving integration of science and industry, identifying areas of importance that brings economic upsurge to the country such as dry land management, food grain and oil-seed production.

Dr T. N. Ananthakrishnan, Director, Entomology Research Institute, outlining the objectives of the seminar emphasized the need for an integrated approach to problems involving a number of disciplines and indicated that aspects such as chemical ecology, insect immunogenetics, insect enzyme systems, sensory physiology, bioenergetics and rhizosphere entomology to be the front line areas and that integrated pest management should serve as the meeting ground for both basic and applied entomologists. He also indicated that, for effective management and increased productivity this link-up through the involvement of co-ordinated programmes between basic and applied entomologists is very essential.

Dr A. K. Raheja, Assistant Director General (Entomology and Plant Protection), Indian Council of Agricultural Research, highlighted the potential areas of research in plant protection such as the promotion of integrated pest management concept to be extended to all major crop plants, the survey, surveillance and monitoring of forecasting systems, application of biotechnological methods for pest and disease management as well as a natural screening facility for germplasms.

Prof. S. Jayaraj, Vice-Chancellor, Tamil Nadu Agricultural University, laid stress on ecologically sound and economically viable programmes in IPM and indicated the role of semiochemicals, polygenic resistance studies, effect of environment on resistance, identification of suitable idiotypes, proper survey and selection of strains of plants that are genetically stable as being significant areas in future research. Areas like insect genetic studies, insect endocrinology, various mass culturing methods, transgenic plant variety production, cellfusion techniques to mention some of the more relevant areas deserve to be energized, he said.

Dr P. S. Ramakrishnan, Jawaharlal Nehru University, New Delhi, discussing about the significance of studies on biological diversity of insects highlighted the need for an analysis of diversities in intact and disturbed ecosystems, more notably the diversity of insects and edge effects in disturbed ecosystems. Mortality/natality and population dynamics of insects in fragmented ecosystems as well as population dynamics and forest succession in relation to insect populations were emphasized.

Prof. R. S. Prasad, University of Kerala, Trivandrum, laid stress on microanalytical techniques in a study of vector biology, vector metabolism and vector efficiency in relation to blood-sucking insects and vector probing on a host sensitized/immunized to vector secretions of pathogens. The role of lectins in defense mechanisms and their dual role in agglutination of micro-organisms helping in encapsulation and upsetting of normal multiplication.

In the discussion session that followed, experts from different areas of entomological research reviewed and highlighted the following thrust areas:

1. Chemosensory research involving the importance of visual, olfactory and mechanosensory inputs in regulating insect behaviour particularly feeding, involving receptor specificity analysis through the use of the electroantennogram.

2. Chemical ecology of the insects involving age-correlated biochemistry of host plants including their role of secondary plant substances to enable a proper understanding of allelochemics. The role of tri-trophic interactions in insect control to be highlighted.

3. Enzymes involved in the metabolism of plant allelochemics such as mixed function oxidases activity in 'generalists' and 'specialists' insects in relation to host specificity and enzymatic adaptations of phytophagous insects to phytochemicals.

4. Ecobehavioural, biochemical and genetic aspects of biosystematics of insects enabling identification of biotypes and other polymorphs; the role of aquatic entomology in deciding the trophic level of freshwater ecosystems.

5. Insect neurobiology, hormonal interactions based on isolation of monoclonal antibodies, genetic control of hormonal metabolism, role of prostaglandins as well as studies on ecdysteroids, antijuvenile agents and recombinant DNA techniques in neurobiological studies of insects. Recognition of antipeptides in the suppression of neurohormones.

6. Hybrid stability of *Trichogramma* and other biocontrol agents, detailed biosystematic studies on predators and parasites, exotic inputs into biocontrol programmes and environmental management of natural enemies, utilization of entomophilous nematodes and weed control.

7. Development of mathematical models to predict population dynamics of major pests of agriculture and forests based on extensive data such as weather, flushing and infestation incidence over represented sites across the country. Identification of the key factors involved in the insect infestation of the forest trees, to simulate and predict the course of population as a consequence of habitat management/other human inputs.

8. Search for new strains and UV-resistant pathogens, compatability of host plant resistance to microbes, as well as studies on differential sustainability of insects to viruses like Baculoviruses and Bt toxin receptor affinity. Development of methods of mass production of species such as those of the teak defoliator NPV and utilization of effective population management to undertake multilocation studies including the testing of NPV as an integrated approach.

9. Effects of natural products such as azadirachtin on insect development in an attempt to produce more safer and efficient needs of pest control.

10. Indepth studies in the bioenergetics of carnivorous insects, parasitoids, pollinating and foraging insects, studies on critical energy ratio and energy budgets.

Summing up Prof. T. N. Ananthakrishnan indicated that for effective implementation of these thrust area programmes, there is a need for active involvement of the agricultural universities and traditional universities/colleges so that a meaningful integration of the factors involved in insect pest management assumes real significance.

T. N. Ananthakrishnan, Director, Entomology Research Institute, Loyala College, Madras 600 034.