

Pest-resistant crop varieties: A case for reconsideration

Evidence on fundamental incompatibility of human (and non-target animal) systems to alien molecules, particularly the more generalized biopoisons masquerading as insecticides, is incontrovertible. Similar inference for a host of 'natural' substances occurring in common foods and crops has also been adduced by some workers¹. This may, however, be exceptionable since biological adaptation as well as amelioration of xenobiotic incompatibility are universally conceded. These observations bring into question an important trend of modern pest management: the increasing propensity to develop resistant varieties, often including genetically engineered ones, with accentuation of single chemical (resistant) principles²⁻⁴. Plant bioconcentration of these in response to pest attack may still be low and transitory enough to escape lethal buildups. At least so it would seem from absence of any concrete reports hitherto on the subject. However, artificial generic selection or genetic concentration of single principles severalfold can well be expected to magnify their ancillary biological incongruities to lethal proportions. Thus when even common 'background' minerals, compounds and

elements can induce disruptive biological transformations in natural or induced over-multiplication⁵, complex biosynthetic products of the nature of allelochemicals such as the various terpenes, psoralenes, phenolics, tannins, etc. must necessarily be imputed capacity for gross biological dysfunction in unnaturally high concentrations, as are contrived by design in varietal resistance programmes. A very close, careful and serious reconsideration of the very rationale of such 'biorational' strategies has now become necessary in view of some of these recent perceptions. The intense work entailed, long gestation, dubious long range continuance (the sword of adaptation is always present) and now, highly suspect environmental and human safety factor¹, compel a complete review and revision of concepts and practices of developing and propagating resistant varieties for pest control. Careful epidemiological evaluation of principles selected for bio-intensification must be one of the prerequisites. Implications of long range influences on ecosystems may be another. In any case, induction of resistant varieties as a preferential and optimal panacea for modern pest problems must

now be tempered with pragmatic enquiry and assessment of attendant cryptic hazards of their unbridled deployment. This is an especial imperative in the developing countries which tend to adopt nascent scientific fashions without adequate referential, infrastructural, conceptual, technological and futuristic contexts. The result is thoughtless, fruitless and potentially hazardous exercises which yield gubernatorial approbation but little else.

1. Ames, B. N. and Gold, L. S., *Science*, 1989, **244**, 755-757.
2. Vaeck, M. *et al.*, *Nature*, 1987, **328**, 33-37.
3. Russel, J. *et al.*, *Proc. Natl. Acad. Sci. USA*, 1989, **86**, 9871-9875.
4. Hilder, V. A. *et al.*, *Nature*, 1987, **300**, 160-163.
5. Talmage, S. S. and Waston, B. T., in *Reviews of Environmental Contamination and Toxicology* (ed. Ware, G. W), Springer Verlag, New York, 1991, vol. 119, pp. 47-145.

R. N. SHARMA

Entomology,
National Chemical Laboratory,
Pune 411 008, India

NEWS

A Nigerian and a Mexican share the 1992 Kalinga Award

The 1992 Kalinga Prize for Popularization of Science has been jointly awarded to Peter Akinsola Okebukola of Nigeria and Jorge Flores Valdes of Mexico. The prize was presented in New Delhi on 8 February 1993. The prize of £1000 was instituted by the Kalinga Foundation Trust of India, along with UNESCO.

Peter Okebukola is an associate professor of Science Education at the Lagos State University. He has been in the frontline of science education efforts in Nigeria since 1974 and has prepared teachers for all levels of education. He was the national Chairman of the Integrated Science Panel of the Science Teachers' Association of Nigeria, rated as the most versatile professional body of science teachers in Africa. Okebukola

has been a prolific writer and has authored or co-authored over 120 books, articles and conference presentations. He has organized inter-school science debates/essay contests/science fairs/exhibitions and initiated formation of science clubs in schools and colleges. Okebukola has led a group of authors to write integrated science texts at the school level, facilitating better understanding of scientific concepts. Besides his teaching duties Okebukola devotes time to educating the public in science and technology in daily life through his talks over radio and popular programmes on television.

Jorge Flores Valdes, the co-recipient of the 1992 Kalinga Prize, is currently Director of the Science Communication

Centre at Mexico's National Autonomous University. He is a nuclear physicist by training and has done research on group theory and particle-hole problems and was recipient of post-doctoral fellowships from Princeton University and from the International Centre for Theoretical Physics, Trieste, Italy.

The work of Valdes for popularization of science covers construction of the Museum of Sciences, organization of science lectures and publication and editing of scientific materials meant for the general public. He was appointed the Director of Museo De las Ciencias, a large science centre which opened recently at the Cultural Centre of the University of Mexico. Valdes has con-

tributed significantly to the preparation of some 550 interactive exhibits. He has lectured at universities in Europe and North and South America, organized research colloquia and has been a member of several editorial committees for publication of science books aimed at the lay reader, four of which have been authored by him. Since 1982, Valdes has been in charge of a major programme in Mexico, viz., *Domingos en la Ciencia* and was the first President of the *Sociedad Mexicana para la Divulgación de la Ciencia y la Técnica*, the society set-up to popularize science in Mexico.

Vinay Kamble, National Council for Science and Technology Communication, New Delhi.

IUCAA dedicated

At 7 p.m. on 28 December 1992, Subrahmanyam Chandrasekhar ('Chandra' to three generations of scientists) pressed a button. For a few moments there was a tense silence; then the gathering of around 500 broke out into an applause as there appeared on the large TV screen the bob of the Foucault Pendulum which began its slow but steady oscillations. It was a symbolic act wishing IUCAA success along its eightfold way.

Before Chandra delivered his Dedication Address (printed by IUCAA and available on request) on 'The Series Paintings of Claude Monet and the Landscape of General Relativity' the audience were treated to a brief *Son-et-Lumiere*. The walls and windows of the Central Quadrangle of the Devayani Complex lit up in a dramatic fashion highlighting the architectural beauty of the buildings. This was followed by a Sanskrit invocation from the terrace sung melodiously by two young girls. The verses from the *Yajurveda* called *Śivasankalpa Mana* extolled the power of the mind and thus marked a fitting call for an institution embarking on intellectual pursuits of an ambitious nature.

There were four silent spectators watching all this from the history of science, all of whom, appropriately had something to do with what the Foucault

Pendulum was trying to convey, that we on the spinning Earth are located in a non-inertial frame of reference. First Aryabhata told us, back in the 5th century, that the stars have a fixed frame of reference and that they appear to move from east to west because we see them from a spinning earth. Then came Galileo telling us the same in no uncertain terms about the Earth: 'E pur si muove'; followed by Isaac Newton who talked about the inertial forces that appear to drive the plane of oscillation of the Foucault Pendulum! Finally, there was Albert Einstein who had also worried about the concept of inertia and the inertial forces when formulating his theory of general relativity. As these majestic statues slowly lit up in the ambient darkness they seemed to enjoin the speaker, 'Speak on: we are listening'.

And Chandra spoke on in his precise and inimitable fashion ... about a marvellous cross cultural comparison that ranged from the haystacks and poplars of Claude Monet on the one hand to the general relativistic field equations describing spinning black holes and colliding waves on the other. At the highest level of creativity, the distinction between art and science disappears: the artists and the scientists are motivated by the same pursuit of excellence. Just as the impressionist paintings can portray a series of different ideas from the same basic entity so can the same set of equations in relativity describe widely different physical scenarios ... provided masterminds are at work behind both.

This broad sweep of ideas set the right tone for IUCAA's own broad spectrum of academic programmes, ranging from frontier research in Astronomy and Astrophysics, through pedagogical activities at various levels and the provision of world class research facilities to the public-oriented science popularization. Dedicating this Inter-University Centre for Astronomy and Astrophysics, the second IUC to be created by the University Grants Commission, its Chairman Ram Reddy expressed the hope that scientists from universities and colleges would make ample use of all that IUCAA has to offer.

The Dedication Ceremony was followed by a 2-Day Dedication Seminar on 29, 30 December and also the Foundation Day Lecture. The seminar was pitched at the research level and had

speakers from all corners of the world. Beginning with Chandra's talks on Newton's *Principia*, its relevance to the student of today, the seminar had Richard Bond (Canadian Institute for Theoretical Astrophysics, Toronto) reviewing the latest evidence of ripples in the microwave radiation background and its implication for structure-formation theories, Donald Lynden-Bell (Institute of Astronomy, University of Cambridge) talking on the attempts to obtain solutions of Einstein's equations for a rotating disc, Russell Cannon (Anglo-Australian Observatory, Australia) discussing observations of globular clusters and their age determinations, William C. Saslaw (University of Virginia, Charlottesville) on local and global interactions of galaxies and Sergei Shandarin (University of Kentucky and formerly from the USSR) highlighting the quasi linear regime of gravitational instability and its possible role in the observed large scale structure in the universe. The speakers from within the country included Govind Swarup (from the NCRA) on experimental astronomy in India, Ramnath Cowsik (from the IIA) on his gravitational experiments on the validity of equivalence principle and the limits on the magnitude of the so-called fifth force and Krishna Abhyankar on the history of Indian astronomy. The final talk at the seminar was a review of the A&A activities at IUCAA, presented by its Director.

In his Foundation Day Lecture, Yash Pal made a strong plea for parallelization and networking of information within the country stressing the use of the latest technology for quick spread and a wider sharing of knowledge. His own wide experience of the SITE experiment, the People's Science Move-



Chandrasekhar giving his dedication address